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Translation

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19 December 1980

SOVIET SCIENCE AND TECHNOLOGY POLICY

This non-serial report contains selected translations of Russian articles on the planning and administration of Soviet research and development and the introduction of scientific achievements into industry.

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Moscow MIROVAYA EKONOMIKA I MEZHDUNARODNYYE OTNOSHENIYA No 7, 1980 pp 21-32

[Article by A. Bykov: "Socialist Integration and the Scientific and Technical Revolution"]

[Text] The broad use of the new possibilities being opened up by the scientific and technical revolution has paramount significance for the creation of a material and technical basis for the development of a socialist and a communist society and for strengthening the position of world socialism in the competition and antagonism between the two world systems. Socialist economic integration, which is directly related to the scientific and technical revolution, aids the assimilation of the achievements of modern science and technology in the interests of peace and hastens the march of socialist and communist construction. The integration process, essentially, is an important prerequisite for the successful accomplishment of the task of historical significance put forth by congresses of the CPSU and other brother parties of CEMA countries: to unite the achievements of the scientific and technical revolution organically with the advantages of socialism and its inherent methods of management.

Socialist integration permits overcoming more successfully the internal limitations from insufficient material and intellectual resources. It contributes to the optimization of their use in the framework of cooperation and to the application of coordination and cooperative planning forms and large-scale goal programs that are necessary for doing this. All this is accompanied by a persistent orientation in the structure and mechanism for cooperation toward the possibilities and needs of the scientific and technical revolution and by the use in the integration process of progressive trends toward the international division of labor.

"We communists," remarked L. I. Brezhnev in the Report to the 25th CPSU Congress by the CPSU Central Committee, "proceed from the principle that only under socialism does the scientific and technical revolution find true expression, responding to the interests of man and society. In its turn, only on the basis of hastened development of science and technology, can the ultimate tasks of the social revolution be accomplished -- can communist society be built."1

Socialist cooperation has entered the 1980's as a very dynamic force in the world. CEMA countries provide about one-third of the world's industrial production, including more than one-third of the world's machine-building and chemical production. Under the influence of the scientific and technical revolution in the economy and, above all, in the industry of CEMA countries, important structural improvements have taken place. In the gross national product, industrial production has started to predominate; the share of machine-building and metal processing, chemistry, and electrical energy production among CEMA countries has increased from 14 to 38 percent in 1950 to 35 to 48 percent at present.

Raising the effectiveness of civil production and broadly introducing advanced engineering and technology have led to growth in labor productivity in industry in CEMA countries during this same period by a factor of 5. Scientific research and development have occupied about 5 million persons, including 1.6 million scientific workers (about one-third of the world total), who are responsible for more than 20 percent of the world's inventions. Growth in the effectiveness of scientific and technical activities finds expression in the widely recognized achievements in mastering space and natural resources, in the development of electrical energy, metallurgy, a number of branches and subbranches of machine building, and in the successes of fundamental sciences, above all in mathematics, physics, astronomy, biology, and medicine. Practically all CEMA countries have made significant achievements in improving the welfare of the people.

The advantages of the socialist economic system, which are opening up more fully in national and international contexts, stand out particularly against the background of crisis phenomena of the world's capitalist economy. For the latter, low, unstable growth rates, massive chronic unemployment, operation under capacity of a significant part of production capabilities, galloping inflation, and currency, raw-material, and other disorders have become typical.

Today, the majority of CEMA countries are accomplishing the complicated task of intensifying the economy, the growth of its effectiveness and qualitative indicators and, on this basis, further increasing the welfare of the people in accordance with the possibilities and criteria for the development of socialist society. This is promoted by modernization of the production apparatus and the improvement in its structure, the hastening of the rate of scientific and technical progress, and fuller and more consistent use of scientific and technical achievements, the role of which is growing immeasurably in the solution of economic and social problems and in strengthening defense. Raising the yield of CEMA countries' mutual cooperation and deepening their integration acquires particular significance.

The most substantial feature of the scientific and technical revolution is the process of transforming science into a direct productive force. Well-worn are the words of K. Marx to the effect that insofar as the development of large industry, the creation of real wealth depends less and less on work time and the quantity of expended labor and more and more on the general level of science, the progress of technology, or on the application of this science to production.[2] In this connection, the role of the scientific and technical factor is growing in national construction, in the system of international division of labor, and in cooperation among CEMA countries.

II

Progress in world economic relations in the last decade indicates a qualitatively new stage in the international division of labor. As was noted at the 25th CPSU Congress, "One of the characteristics of our time is the growing utilization of the international division of labor for the development of each country, whatever its wealth and economic level."[3]

During the last three decades of cooperation within the CEMA framework, socialist countries have gone from bilateral agreements for mutual commerce to joint development of long-term goal programs and also bilateral long-term programs of production specialization and cooperation. These programs are conceptually new, complex forms of planned joint activity, which constitute a fundamental advantage of socialist integration in contrast with the market mechanism of capitalist integration.

It is the planned methods of regulating mutual trade among CEMA countries that have caused its high rates of growth and improvement in structure. This, above all, relates to those countries that entered into cooperation with a low level of economic and especially of scientific and technical development and through cooperation were able to make a fast dash to the levels of countries with relatively high indicators of national development.

In 1978, mutual trade among CEMA countries reached 103 billion rubles or over 59 percent of their total external trade. This is a growth by more than a factor of 22 in comparison with 1949, when CEMA was created. Progress in individual components of commodity circulation is also substantial: the share of machines and equipment in mutual export increased from 20.5 percent in 1950 to 43 percent in 1978. In the current five-year plan, in accordance with long-term agreements, mutual deliveries of machines and equipment are worth 90 billion rubles and, to a significant degree, supply the growing demands of CEMA countries for technical rearmament of industry, transportation, and agricultural production.

The most important prerequisite for technical progress and intensification of the management and growth of commodity circulation and improvement of its structure is the development and deepening of international specialization and cooperation in CEMA-country production, especially in the manufacturing sectors of industry (machine building, metal processing, and chemistry). About 40 percent of the mutual deliveries of machines and equipment (against 18 percent at the beginning of the 1970's) occur in specialized production although the share is significantly above the average in the exports of a number of European CEMA countries. The level of specialization of production by CEMA states is constantly growing, although the results achieved, especially in the field of cooperation, still considerably fall short of existing possibilities.

From the time that the Complex Program for Socialist Economic Integration was adopted in 1971, much has been done for the development of specialization and cooperation in CEMA country production, including that in a number of new sectors and subsectors. Among them are electronics and instrument making, directly tied to the scientific and technical revolution, where the preconditions for rational specialization and cooperation are extremely favorable. The convincing proof is the cooperation in the production of a unified system of compatible computers of the third generation and their software. In it, about 30 scientific research and planning-design organizations and over 70 industrial enterprises of CEMA countries are participating. In machine building, where specialization and cooperation are more long-range, corresponding agreements being realized in the current five-year plan (over 80 have been concluded just on a multilateral basis) cover up to 10 thousand types of products. Over one thousand agreements regulate bilateral specialization and cooperation.

The high level of industrial production achieved in most CEMA countries, especially in manufacturing industries, their socialization in the course of improving the management of the economy, the policies of intensification and related modernization of the production plant and of reducing heavy and unproductive manual labor, and savings of energy and materials, create favorable possibilities for using the advantages of international specialization and cooperation. This course also aids the further augmentation of mutual commodity exchange and the increase in this exchange of the proportion of finished products, assemblies, components, and semifinished products.

At the same time, such a policy creates practical preconditions for surmounting the structural complications in the development of the integration process. It is extremely forward looking as a means for raising the effectiveness of production, hastening scientific and technical progress, decreasing the number of types of products being produced, especially broad in a number of small, highly developed European countries, concentration of efforts and resources on priority areas of long-term specialization.

Significant possibilities are opened up by cooperation in the production of machines, equipment, chemical products, based on subassembly and component technological specialization, with the concentration of output of end products by one or several of the partners. It is by this means that a large circle of technologically interrelated enterprises of various countries can be more easily included in cooperation, that the advantages of their specialization and ability to complement one another are provided, and that the changes related to them are activized.

In determining areas of specialization and cooperation, as experience shows, it is important to be guided by long-term tasks and to choose as objectives the most promising types of production. It is they that concentrate the latest achievements of science and technology. Only effective orientation toward the output of up-to-date, high-quality products can provide a solid, long-lasting basis for specialization and cooperation. Especially forward-looking are those areas in which the Soviet Union and other CEMA countries have done scientific work which surpasses the developments of world science and which permits opportune entrance into markets not only of CEMA countries but of the world, with new competitive, progressive products.

Taking into account the trends of the scientific and technical revolution, it is necessary to have timely orientation of joint efforts toward the most important of these trends, especially the production of advanced implements of labor using, not mechanical force (striking, rubbing, cutting), but electromagnetic and electrosonic waves and other forms of intramolecular and subatomic forces. The main area of development of conceptually new technology is the creation of a system of machines that include devices for automatic self-regulation, in support of complex mechanization and automation of production processes. It is along such lines that cooperation between science and production must be formed by the countries of the socialist cooperative.

The CEMA states had come to the conclusion already in the mid-1970's that it was necessary to develop long-term goal programs for cooperation in a number of very important fields, including machine building. Calculated for 10 to 15 years, these programs permit overcoming the comparatively narrow bounds of five-year agreements and guarantee complex solution of problems, depending on the optimum utilization of resources and of the achievements of modern science and technology and on the advantages of long-term program-goal planning. Thus, for satisfying growing demands for equipment necessary for atomic electric stations, a large-scale, long-term agreement was concluded and is already being implemented for multilaterial specialization and cooperation and mutual distribution of such equipment. The fulfilment of the agreement is coordinated and controlled by a special intergovernmental commission made up of responsible representatives of interested CEMA countries and Yugoslavia. Large machine-building enterprises of the GDR, USSR, CSSR, and other brother countries are participating in its realization.

In parallel, in accord with understandings reached at the time of the Crimean summit meeting, CEMA states are concluding arrangements for long-term bilateral programs for specialization and cooperation in production. Such programs have already been signed between the USSR and CEMA European countries. Both trends are closely tied together and complement one another, and they create a new progressive structure for the international division of labor.

The implementation of goal-programs for cooperation and bilateral programs for specialization and cooperation in industry and of the multilateral and bilateral agreements being concluded on their basis is becoming the pivot for the coordination of economic plans of CEMA countries for 1981 to 1985. International understandings are being carried over into the frameworks of integrated and national plans. Under conditions of socialist economics, practical fulfilment of accepted mutual obligations is guaranteed by planned division of resources, conduct of required work, and corresponding mutual deliveries of goods. Their efficient synchronization is an important precondition for timely and full implementation of adopted programs.

The significance of direct relations between production and scientific and technical organizations is also growing substantially. Hence, it is necessary to create conditions in each CEMA country that stimulate enterprises and associations to broaden relationships between production and technology, especially specialization and cooperation with enterprises of brother countries. It is necessary to improve the corresponding organizational forms and cost ratios.

At all stages, cooperation among CEMA countries has served as an important precondition and instrument for equalizing levels of their development. In recent years, a substantial equalization has taken place in levels of national income[4] and economic structure, and in scientific, technical, and economic indicators expressed quantitatively. Today, in accord with the trends of the scientific and technical revolution, stress is put on qualitative indicators, especially on technical-economic parameters of production and their corresponding world standards. Specialization and cooperation, found to be dependent on this process themselves, are called upon to help hasten it.

As a characteristic of the process of equalizing economic levels of CEMA countries, significance is growing in such indicators as progressiveness in the structure of national administrative complexes, the degree of socialization of industry, its concentration and specialization (national and international), technical-economic and technological indicators of the production apparatus, the productivity of civil labor, the presence of science and quality of products, its competitiveness, and the qualifications of workers. It is necessary to note that the differences between European CEMA countries according to indicators of scientific and technical development are still relatively great: the maximum difference in shares of expenditures for scientific research and experimental-design work in the national income was 1:3.8 in the middle 1970's, and calculated per person, 1:4.

With respect to European CEMA countries, the problem of equalizing the levels of economic and scientific and technical development is solved basically with the aid of active utilization of the integration process and of cooperation in production and science and technology. As for participation by Viet Nam, Mongolia, and Cuba, in the integration process, they depend on bilateral and multilateral aid from the economically more developed CEMA participants. This aid is granted through the assignment of privileged credits, economic and technical assistance, including some without compensation, transfer of scientific and technical documentation and production experience, and aid in the assimilation with considerations for the specifics of local conditions. On the other hand, Viet Nam, Mongolia, and Cuba, within the framework of socialist integration, can increase their export production, counting on a guaranteed external market.

As for the inclusion of new progressive production and the creation of large, modern enterprises within the system of international division of labor, the integration process allows determination of the optimum areas and parameters with consideration of the needs and possibilities of the whole cooperative effort. This aids the formation of large new industrial centers. Thus, socialist integration opens up additional possibilities for solving complicated problems in building the material and technical basis for socialism in economically weaker countries and for their access to the scientific and technical revolution and in bringing about a social and economic transformation.

III

In the course of scientific and technical cooperation there has been a reorientation from primarily exchange operations at a specific stage, having a noncompensation character, to cooperation in conducting research and assimilation of research results, including that done on a cooperative or joint basis. Scientific and technical cooperation penetrates the system of mutual economic relations more deeply. A complex international system is formed, from science to industrial assimilation of its results and the marketing of products. There have been gains in strength by plan-coordination and organizational bases for scientific and technical coordination and cost-accounting relationships.

Whereas the summary plan for the coordination of multilateral cooperation for 1966 to 1970 included 50 problems and 183 subjects (620, counting subjects of the economic sectors), for 1971 to 1975, there were 193 problems and 808 subjects, and for 1976 to 1980, 270 problems and 1330 subjects. From plan to plan, not only have the subjects and the number of multilateral participants increased, but a qualitative improvement (better selection of subjects and forms of diversification) has also taken place. Greater attention has been given to complex problems of an inter-sector character, especially those relating to new areas of the scientific and technical revolution.

In the Agreed Plan for Multilateral Integration Measures for 1976 to 1980, along with large-scale production problems, 17 very important scientific and technical problems were included. The countries allowed 565 million equivalent rubles for their financing. An analogous plan is being developed for the next five-year period. In it, special attention is given to clear reinforcement of supply tasks with special provisions in national plans for material and technical resources and organizational and personnel possibilities. All five of the long-term goal programs adopted by the 32d and 33d CEMA sessions include the development of about 120 scientific and technical problems, reflecting the high degree of orientation toward modern science and technology. The whole system of plans for multilateral and bilateral scientific and technical cooperation covers over 4 thousand problems and subjects. There is participation in their development by more than 3 thousand scientific research and planning-design organizations and higher educational institutions of CEMA countries, of which over half work on a multilateral basis.

In accord with the Complex Program and the tasks it defines, over 100 multilateral agreements have been concluded for scientific and technical cooperation on the most important problems. The strengthening of direct relations at the agency level aids the implementation of several hundred bilateral agreements and contracts for scientific and technical cooperation.

In the course of implementing the tasks of the Complex Program, about 15 thousand projects of both theoretical and applied character have been completed; they cover almost the whole spectrum of modern science and technology. Among these are 1.7 thousand new designs for machines, mechanisms, and instruments and over 1.3 thousand technological processes. The number of joint inventions is growing, although their practical utilization, especially joint utilization, remains insufficient.

Concentrating in their hands the basic levers for the planned development of science, technology, and production, the countries of socialism are putting together real possibilities for carrying out agreed scientific and technical policy and, related to it economic policy, within the framework of the integration process. This is undoubtedly an advantage of the integration being brought about by socialist countries in comparison with that of capitalist states and their integration groupings. Further intensification of scientific and technical development of CEMA countries and cooperation in this field offers better opportunity for their scientific and technical potentials to complement one another according to production specializations within the framework of agreed policies of cooperation.

Along with increasing the effectiveness of coordinated, cooperative, and joint research, an important area for further improvement in cooperation in the field of science and technology is its organic tie, especially in applied research, with production and marketing arrangements, investment cooperation, and especially with specialization and cooperation in production. This allows overcoming the planning-organizational and technological gaps between science and technology and economic cooperation and hastening collective utilization of the results of joint research, and raising the technical level of specialized production. Under current conditions, there is a substantially growing role for collective definition of priority areas of scientific and technical development suitable for cooperation. In this regard, it is necessary to allow for national and international tasks, including the strengthening of technological positions of cooperation in the international arena and in the system of the worldwide division of labor.

An important precondition for the program-goal approach to problems of scientific and technical development under conditions of socialist integration is the internationalization of the "science-technology-production-marketing" system. This is provided above all by complex planning, which establishes strong links (in time, resources, and organization) between all participants at the integrated and national levels. Economically, such internationalization also makes "continuous" cost accounting possible in the development of cooperation among all participants and reinforces the legal path for concluding complex agreements and economic contracts which effectively determine the mutual obligations of participants and their financial responsibility. And finally, organizationally, it provides for the management of complex cooperation through the creation of capable coordinating bodies, joint research and marketing organizations, and scientific-production and economic associations.

Within the framework of scientific and technical policy agreed to by CEMA countries, which is oriented toward predictable end results and which defines the prospects for cooperation, it is necessary to combine optimally and to utilize national, integrated, and global factors of scientific and technical development. This permits, on the one hand, improvement in supplying new technology to the cooperative, and strengthening the effectiveness in using the scientific backlog and production technological possibilities available within its framework. On the other hand, it creates the possibility for liquidating existing parallelism in acquiring and using Western technology or in gaining access for CEMA countries to world markets with their own scientific and technical achievements and products.

Thus, consistent intensification of scientific and technical collaboration and its concentration on leading problems, improvements in its ability to obtain results, above all, by means of links with production and marketing, improvement in the mechanism of collaboration (plan coordination, cost accounting, institutional collaboration), and the implementation of agreed-upon scientific and technical and structural policies -- these, it seems, are the chief ways to raise the effectiveness of this most important aspect of socialist integration.

IV

In interpreting the substance and consequences of the scientific and technical revolution, the ideologues of modern capitalism have undergone a complicated evolution from unrestrained "technological optimism" to extreme pessimism, reflecting the deep crises that bourgeois society is going through at the onset of the 1980's. In the first instance, they proclaimed the transformation of capitalism to some kind of superclass "industrial" or "post-industrial" society; then, the coming of the "era of enthroned technology," in which social conflicts would be lessened and class antagonisms would be overcome, and the way would be opened for the convergence of the two antagonistic social systems through the absorption of socialism by capitalism. Representatives of the second trend ascribe all the troubles of capitalism to one or another "technical civilization" and propose a thesis of supposed "limits of growth" inherent in social development, tied with the inevitable exhaustion of resources and degradation of the environment.[5]

In both instances, hopes for the rejuvenation of ailing capitalism and liquidation of insuperable contradictions are placed on the scientific and technical revolution.

Marxist-Leninist theory tied the scientific and technical revolution with the social revolution and showed that a new, higher communist civilization would appear as the result of the organic union of the possibilities with the advantages of a new social structure.

The new structure resting on the achievements of modern science and technology, has been able to solve the complicated problems of global character that have stood in its path. At the same time, it has run into difficulties flowing from the limitations and uneven distribution in the world of a number of important natural resources, from rising prices for them, and from the definitely negative influence on the economic development of the countries of socialism by the confusion in the world capitalist economy.

Mutual cooperation among socialist countries has provided and continues to provide, within the framework of the international socialist division of labor, satisfaction of growing needs for energy sources, raw materials, and food stuffs. It helps find mutually acceptable solutions for these complicated problems on the principles of equality and sovereignty of the parties, mutual advantages, and comradely mutual aid. This is made possible by all of the long-term goal programs in the fields of raw materials, energy, foodstuffs, consumer goods, and transportation and machine building, in which the latter has been oriented toward technical support to the needs of the other programs. It is in this area that the investment and the scientific and technical cooperation by CEMA countries are concentrated.

A convincing example of the joint implementation of a unique project of great economic significance was the construction of the gas pipeline "Soyuz" (from Orenburg to the western boundaries of the USSR). The first electrical transmission line with a current of 750 kV has been put into operation from Vinnitsa (USSR) to Al'bertirsha [Russian transliteration] (Hungary). It serves as an important link of parallel work between the associated energy systems of CEMA countries and the Unified Energy System of the USSR. The rates of growth are building up in many other joint projects that are under way. Long-term programs have been called upon to provide hastened development of atomic power and increased extraction and improved utilization of CEMA countries' own fuel resources, and the further development of their associated electric power systems.

The raw material and energy program foresees more complex processing of petroleum and gas, limitations on their use as fuel, and creation through joint efforts of new capacities for the output of metallurgical, chemical, cellulose-paper, and microbiological products. A large contribution to the solution of the energy problem is the construction in CEMA European countries and Cuba of atomic electric stations with a total capacity of

37 million kW and the erection on USSR territory of two more atomic electric stations with a capacity of 4 million kW to deliver electrical power to brother countries. Cooperation is envisaged for further development of nickel production in Cuba. The first turnover has taken place at the Soviet-Mongolian copper-molybdenum combine "Erdenet" in the Mongolian People's Republic.

Solution of the fuel raw-material problem of CEMA countries is inseparably linked with the introduction of new engineering and technology, which will be able to curtail the proportion of energy and material that is utilized in production, with the development of new sources of energy and new construction materials and chemical products. For this, it is intended to create in the USSR, close to the sources of raw materials and energy, large modern chemical plants and, on the territory of other CEMA countries, plants that consume less energy, to serve the growing needs of the cooperative for chemical products.

As for environmental protection problems, here also socialist cooperation provides a convincing example of effective cooperation on the basis of the principles of plan coordination inherent in socialist integration. The program of cooperation adopted by CEMA countries for 1976-1980 on environmental protection and rational utilization of natural resources contains over 150 interrelated scientific and technical tasks. They are being accomplished within the framework of 15 CEMA bodies, 8 coordination centers, and 2 specialized international organizations, with the forces of 540 scientific research and planning-design organizations of participating countries. New means for purifying sewage and harmful industrial exhaust gases and control and measuring instruments for determining the degree of atmospheric pollution already have been created and are being introduced into practice. Water purification equipment has been developed, introduced, and put into operation by the international economic association "Intervodochistka," which was created in 1977, by means of organizing appropriate cooperation and providing related services.

CEMA countries are in favor of broad international relations with respect to global problems on both a bilateral and multilateral basis. As early as 1975, the USSR put forward the idea of conducting an all-European congress or interstate meeting on questions of cooperation in the field of environment, transportation development, and energy. As for environmental protection, in November 1979, in Geneva, a high-level all-European conference was held under the aegis of the Economic Commission for Europe of the United Nations. The meeting resolved to enter into international cooperation without delay to avert air pollution and approved a corresponding convention. It also adopted a declaration on introducing reduced-waste or waste-free technology and waste recycling.

Implementation of the understandings achieved at the conference and also of other Soviet initiatives is making an optimum contribution to solving concrete global problems, the urgency of which is growing both for Europe and for the world as a whole. This will serve as an important landmark in realizing the Helsinki understanding and permit, particularly, making available to the whole world the rich experience accumulated by CEMA countries in the collective solution of such problems.

Speaking at the World Congress of Peace-Loving Forces in Moscow (1973), L. I. Brezhnev pointed out that keeping in step with the times and reaching the level of needs and possibilities of the scientific and technical revolution are possible only on the basis of broad international division of labor. CEMA countries are consistently implementing such an approach in their external economic policies, actively using the open character of socialist integration being brought about with consideration of the possibilities of worldwide division of labor. This is supported by the high rates of growth in their trade with both developing countries and developed capitalist countries.[6]

CEMA countries have provided broad assistance to developing states in creating and strengthening their economic and scientific potential and in forming the necessary infrastructures and personnel forces.[7] This has aided the accessibility of liberated states to the achievements of the scientific and technical revolution and has aided their resistance to the political, economic, and technological expansion of imperialism, and has aided the strengthening of national independence and sovereignty. Especially effective has been aid to countries that have chosen the path of noncapitalist development. In a number of instances, it has been provided on a multilateral basis using the CEMA mechanism.

Among areas of cooperation among CEMA countries with developing states, especially farsighted are those which aid in creating and strengthening the industrial and scientific-technical base necessary for national development and which foster the transfer of modern technology and its utilization under local conditions, and which broaden the long-term stable cooperative relations in extracting and processing industries and science and technology.

In East-West collaboration, along with traditional trade, new long-range forms are receiving application. These are scientific-technical, scientific-industrial, and industrial collaboration and, related to such collaboration, cooperative relations and joint construction, including that on a compensatory basis. Mutually advantageous exchange of technology and services is growing and credit relations and investment cooperation are developing. In a number of instances, such operations are closely tied with integration measures undertaken by CEMA countries. The realization of long-term goal programs significantly broadens the preconditions for mutually advantageous East-West collaboration both in traditional and new forms.

Socialist integration is substantially broadening the possibilities for collaboration by CEMA countries with developed capitalist countries and developing countries in the field of raw materials and energy, processing industries, and consumer goods production. The mechanism of integration and its plan-coordination instruments allow the combining of intra- and extra-regional variants to the solution of one or another economic or technical problem that may be urgent for CEMA countries. The integration process significantly increases the overall possibilities, needs, and resources of the CEMA countries. The farsightedness of multilateral projects grows with the enlargement of the scale and complexity of cooperative projects, more and more acquiring a long-term, stable character. An example of this can be found in certain integration projects that have already been completed or are being carried out (gas pipeline "Soyuz" and the Ust'-Ilimskiy lumber industry complex), in which companies from capitalist states participate along side of CEMA countries with corresponding deliveries.

CEMA countries are striving to combine the deepening integration process with broadening their participation in the worldwide division of labor. However, the full realization of the possibilities connected with it require normalization of international collaboration which is quite often disturbed by the arbitrary political actions of the West. The urgency of such normalization is confirmed by the discriminatory practices, which not only continue but sometimes even grow stronger, on the part of the imperialist powers and their integrated groupings in relations with socialist states.

In recent times, the American administration has begun a campaign in the spirit of the "cold war" to revive the policy of embargos on trade with the USSR, trying to attract to it its NATO partners and also certain unaligned states. The United States has resorted to the harsh imposition of control over deliveries of modern technology and bans on a number of agreed-upon deals. They also are trying again to activate the functioning of COCOM, a body for the coordination of discriminatory policies, especially created at the height of the "cold war" in the NATO structure (NATO countries without Iceland but including Japan). Bourgeois propaganda again is reviving the false thesis that collaboration with socialist countries offers a "one-way street" and the delivery to them of new technology can increase the military potential of a probable adversary.

Life already many times has confirmed the farsightedness of V. I. Lenin's conclusion that an economic blockade is a two-edged sword. "With respect to blockades, experience has shown," he wrote, "that we do not know whether the blockader or the blockaded suffers most."[8] As for the exchange of technology, it is just as mutually advantageous as is East-West collaboration as a whole. As is known, the USSR, resting on its own science and technology and industrial resources and achievements, has created a modern defense potential roughly equal to that of the West which, it is hoped, will protect the socialist association from any provocation by imperialism or its accomplices. Limitations on the exchange of technology practiced by the United States are only able to undermine trust in them as partners in collaboration.

It must be noted in this connection that a majority of countries of Western Europe, where the basic part of East-West trade and scientific and technical exchanges is concentrated, have not expressed readiness to support the doubtful initiative to roll back business relations with the USSR. There is no doubt that expansion of relations between East and West would help normalize relations between CEMA and the EEC on an official treaty basis. CEMA as early as 1976 offered an appropriate initiative, but it did not receive the proper realization, primarily because of the lack of desire by the partner to recognize the equal capabilities of bodies representing two European integrated associations which differ in social and economic character.

The scientific and technical revolution has a universal character and requires broad international cooperation for effective solution of the problems presented to it. The countries of socialism, participating in integration, are demonstrating the collective form and a business-like approach to such problems. In accord with the spirit of the times, following a chosen course for detente, these countries consistently support the normalization and development of international economic and scientific-technical relations, with consideration for new arrangements of world forces and in the interests of all participants, independent from distinctions of social structure and levels of economic development. Inflexible determination to follow this tested course has found new convincing support in the anniversary conference of the Political Consultative Committee of Warsaw Pact States, which took place in Warsaw (May 1980) in documents of great political importance that were unanimously adopted by the convention.

FOOTNOTES

1. "Materialy XXV s"yezda KPSS" [Materials of the 25th CPSU Congress], Moscow, 1976, p 47.

2. See K. Marx and F. Engels, "Sochineniya," Vol 46, Part II, p 213.

3. "Materialy XXV s"yezda KPSS," p 56.

4. Whereas at the time CEMA was founded the ratio between the highest and lowest levels of national income per person in European countries was 3.2:1, it is now 1.3:1; in industrial production the analagous figures are 5:1 and 1.5:1.

5. Club of Rome materials are characteristic of this level.

6. During 1950-1978, commodity circul[illegible] f CEMA countries with developing states was the most dynamic sect[illegible] ternal trade and increased by a factor of 32. In 1978, commodity [illegible]nge between CEMA countries and developed capitalist countries rose [illegible] comparison with 1970 by a factor of 3.5 (current prices) and reached 47.5 billion rubles.

7. With the participation by CEMA countries in developing states, more than 4 thousand separate projects were put into operation or are being

constructed (of these, about 3 thousand have already been put into operation). In the developing countries themselves, 600 thousand of their citizens received qualifications. In addition, over 40 thousand citizens from more than 100 developing states have studied in educational institutions of CEMA countries. Over 30 higher and secondary educational institutions have been built or are being built with the aid of socialist cooperative countries, and over 150 educational centers and vocational and technical schools have been built and equipped. The CEMA stipend fund functions successfully, providing means for 2.5 thousand stipendiaries from 44 developing countries to study.

8. V. I. Lenin, "Polnoye sobraniye sochineniy" [Complete Works], Vol 44, p 301.

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ALEKSANDROV: EMBARGO FORCES SOVIETS TO EXPAND INSTRUMENT-MAKING INDUSTRY

Moscow OGONEK in Russian No 23, Jun 80 p 5

[Interview with Academician A. P. Aleksandrov, president of the USSR Academy of Sciences, by correspondent S. Vlasov: "Academician A. P. Aleksandrov: There Are No Alternatives!"]

> [Text] In Alma-Ata, work has come to an end for the regular session of the Council for the Coordination of the Scientific Activities of the Academies of Sciences of the Union Republics. On the agenda were three topics: the development of instrument making for scientific research, the complex utilization of useful minerals, and the scientific problem of combining economic-sector planning with regional planning.
>
> The work of the session included participation by the presidents of all the republic academies of sciences and by noted Soviet scientists, including the president of the USSR Academy of Sciences and chairman of the Council for Coordination, Academician A. P. Aleksandrov.
>
> Our special correspondent, S. Vlasov, asked him to respond to some questions.

[Question] Anatoliy Petrovich, how do you evaluate the significance of such meetings for the development of Soviet science?

[Answer] First of all, they provide the opportunity to exchange opinions and to receive necessary information first hand. For such an immense country as ours, such exchange has extremely important significance. The sessions permit the correct distribution of scientific work among the republics so that the same research is not repeated. And if some duplication is needed, then we can plan it in such a way as to bring about different approaches to a single problem for a more complete understanding of it.

We try to coordinate scientific research in the republics so that one of the institutes is the leader in one field or another. For example, the management of all work on electric welding in the country is assigned to the Kiev Institute of Electric Welding imeni Ye. O. Paton. And although this work is carried on in many places in the Soviet Union and did not even originate in the Ukraine, we considered it advisable to have all research in this field coordinated by the Kiev institute -- so great were the successes of the Ukrainian scientists.

We could introduce many such examples.

But only to coordinate scientific work -- this is not enough, of course, to insure success. Right now, we are experiencing a sharp need for continuous exchange of information. Unfortunately, at times we are so poorly informed about the unfinished work of our colleagues that we do not even know what is going on at the institute next door. Sometimes, we start research on some problem, not suspecting that similar work has been going on for several years in another republic. As soon as possible, we should organize the publication of a quarterly bulletin of scientific information so that we can see where research is being done and what the practical results are.

[Question] It is known that this is not the first year that the Academy of Sciences has been concerned with problems in scientific-instrument making. Why has this question today been the center of attention at the regular session?

[Answer] Unfortunately, I must acknowledge that until now our achievements in the field of instrument making for scientific research have left much to be desired. Often we have to buy instruments abroad, but, from the beginning of the development of such an instrument by a foreign firm until we introduce it into practical use here, it takes sometimes five or ten years and we are already receiving obsolescent equipment which we will have to replace in two or three years.

[Question] But surely, we do not buy instruments abroad because we cannot make them ourselves. Even one of the most developed countries in the world does not have such unique equipment for research as our six-meter telescope or the "tokamak" (device for the study of thermonuclear processes).

[Answer] Entirely correct. Such complicated scientific problems as the mastery of atomic energy, the creation of rocket and space technology, and a number of other very difficult problems we have solved without any aid from abroad. However, often without any real need, instead of developing some instrument or technological system ourselves, we buy it from abroad. This sometimes involves lags in a given field of science or technology. There are practically no instruments or technologies that we are not capable of creating. It was not long ago that Britain refused to supply us with some tracer compounds which, until then, we had not produced. The need forced us to create them within three weeks. Now, we can export them ourselves.

Something similar happened last year when the Americans refused to provide us with catalysts for removing sulphur from petroleum products. Our scientists created and introduced new catalysts in an unprecedented short time. Moreover, it turned out that our catalysts were much more effective than the imported ones: they can clean the petroleum in one phase, while the American catalysts required two phases.

Earlier, we very readily agreed to foreign purchases of instruments, catalysts, and reagents, but now we see that in this case the development of our science and technology depends on the whims of some Western policy or another. One is automatically reminded of V. I. Lenin who, immediately after the revolution, urged the development of our science on the basis of our own personnel, raw materials, and technology. This position still remains valid today.

Of course, it is silly to invent a bicycle, but if they will not sell it, then we have to invent it.

[Question] For what specific instruments do our scientists have a special need?

[Answer] First of all, they are measuring instruments and instruments for automating scientific work and for laboratory research. In developed capitalist countries, the Federal Republic of Germany or Japan, for example, expenditures for the creation of scientific instruments constitute 20 to 30 percent of the total expenditures for science. We have a significantly lower figure. The Academy of Sciences is trying to improve our position. Two factories have been built for instrument building; construction and planning of a number of new enterprises have begun; and a Scientific-Technical Association of the USSR Academy of Sciences has been created. The development of new scientific instruments is being carried on successfully in the academies of science of the Ukraine, Kazakhstan, Uzbekistan, Azerbaijan, and Latvia.

The total volume of production of high-quality, up-to-date instruments for scientific research is constantly increasing. However, the types and quantities of instruments being developed and turned out still do not satisfy the requirements of scientists. Frequently an insufficiently distinct boundary line is drawn between developments of instruments for scientific research and instruments for general industrial purposes.

Coordination work done in republic academies of sciences on the creation of instruments for scientific research is clearly insufficient. Cooperation is limited between design organizations of the national Academy of Sciences and the academies of sciences of the union republics. In this field, there is still much to do.

If we want to have advanced science, we must develop scientific instrument making at an outstripping rate. Today, the question is this: either we can create a good instrument base for scientific work or we will find it very difficult to reach world levels of achievement in those fields of science and technology where we are now behind.

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FAR EASTERN SCIENTIFIC CENTER'S PROBLEMS IN INTRODUCING NEW TECHNOLOGY

Moscow KOMSOMOL'SKAYA PRAVDA in Russian 13 Jun 80 p 2

[Article by Ye. Ippolitov, director of the Institute of Chemistry of the Far Eastern Scientific Center and corresponding member of the USSR Academy of Sciences: "An Idea Awaits Realization; How to Hasten the Introduction of Scientific Developments into Production"]

[Text] I can state with certainty that fruitful scientific ideas do not arise every hour. Rather they often appear in the process of solving important tasks of present-day production. I shall explain this with an example: At one impressive meeting, scientists of the Far Eastern Scientific Center could see a substance, perborate, made for the first time in our institute of chemistry.

How valuable is the new substance?

Industry now makes perborate as a bleach with a content of hydrogen peroxide up to 10 percent. In our perborate there is more peroxide by a factor of six. And this permits decreased use of scarce boron for washing purposes.

Decisions of the 25th CPSU Congress and the decrees of the CPSU Central Committee which followed, on the development of science, clearly indicate that we must conduct fundamental research that will allow improvement in our production. At the same time, a comparison of expenditures for science in the Far Eastern Center with the economic effectiveness of work being introduced into production shows that our institutes still lag significantly the institutes of Siberia and the Ukraine according to this indicator.

There are several reasons, it seems to me, for such a situation. First, we still do not have the psychological climate which you feel, for example, in institutes of the Siberian Department of the USSR Academy of Sciences concerning the development and introduction of new scientific ideas into production. Among us the opinion is still widely held that fundamental research and the introduction of new technology are mutually exclusive and that institutes of the Center must concern themselves only with "pure" science. The results of their labors are printed articles and monographs. However, the development of the productive forces of the Far East and the swift growth of industry require from the scientists of this region not only "pure" science but practical developments.

One of the scientific trends of our institute is the creation ot new methods for processing the mineral raw materials of the Far East. This trend has been dictated by reality. That is because the processing of ore in our region is tied to definite difficulties. The construction of metallurgical production in the northern Far East, in the regions of rare-ore mining, is economically infeasible: labor resources are limited and expenses are great. It would be simpler, presumably, to transport the ore to the southern regions of the Far East, where there is already a mining-metallurgical industry, for its processing and making of concentrate. However, the possibility for developing a metallurgical base here is also limited. Why is that? A way to process ores must be found that does not require large expenditures of capital and which offers high labor productivity. Such a means, based on the application of vortex furnaces, was tried by our institute at an ore field in Primor'ye. The test showed that it can be used at other ore fields in the Far East. But, unfortunately, interest in introducing the new means for processing ores was more evident among the enterprises themselves than among the corresponding ministries , especially the USSR Ministry of Nonferrous Metallurgy.

The level of effectiveness of our developments is influenced also by the weak control by managers of the institutes of the Far Eastern Center over the introduction of finished scientific research into production. Of course, bringing about the needed situation also requires expenditures of nervous energy and effort to overcome traditional attitudes toward the introduction of scientific work into production.. But it must be this way! Without this we cannot reach high effectiveness with our scientific developments nor can we hasten the solution of the harsh problems of production. In the final analysis, without the introduction of their ideas into production, the institutes cannot receive sufficient funds to acquire the latest instruments, which are extremely necessary.

It is a fact that scientists of the Far Eastern Scientific Center have few authors' certificates. For example, in our institute throughout its whole history there had been only two authors' certificates. There were attempts to find out what was the matter. The reason turned out to be failure to observe the rules on publication of scientific works. It happened this way, for example, with the development of an application of sea water for flotation of ores being enriched. It was only necessary to exert control over the observance of the rules, as the number of claims in our institute rose to twenth and we now receive from 15 to 18 authors' certificates a year!

There is still another reason that makes the introduction of developments into production difficult. This is the weak technological base of the institutes of the Far Eastern Center. You cannot approach an enterprise with a "naked" idea. It must first be tested in laboratories and proved in so-called pilot plants, that is, under conditions as close as possible to those of actual production. Consequently, institutes must have their own construction bureaus for nonstandard equipment, room for testing facilities, and service personnel.

Today, a total of three engineers work in the pilot-plant section. There are two designers; naturally, they are not able to keep up even with the most pressing demands.

The Institute of Chemistry is young; it is still not ten years old. Its workers are young, too. For example, young scientists basically handle the problems of new ways to process Far Eastern ores. Assigning them to this subject, we hope that they will find their own path of scientific investigation and that they will make large changes in standard thinking which has become complicated during the last decade in this field. To the credit of the young people, they have justified our hopes. Thanks to the flow of young people today, we already have ceased to experience a shortage of scientific personnel as we did a few years ago. Now the institute has another problem: the strengthening of the material bases. We need fitters, mechanics, and electricians. Rooms that have been freed in our present building have now become shops for experimental production. Now, I am sure that we can rise to the level of the leading institutes of Siberia and the Ukraine both in the number of scientific developments being introduced into production and in their economic effectiveness. And all of this, in the final analysis, will have an effect on hastening the rate of industrial development.

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'PRAVDA': WHY INDUSTRY RESISTS INTRODUCING NEW TECHNOLOGY

Moscow PRAVDA in Russian 27 May 80 p 2

[Article by O. Kosenko, candidate of philosophical sciences: "Problems and Opinions: Inventions Needed"]

[Text] Technical creativity exerts heavy influence on the development of our country's economy. But recently in this sphere, problems have been noted that require serious attention. Particularly striking is the fact that of the total economic effect achieved in the Ninth Five-Year Plan from the introduction of rationalizers' proposals and inventions, the share from the latter was very small.

Today, unfortunately, there is an increasing trend toward petty projects, usually involving insignificant improvements in existing equipment. At the same time, inventions of the kind that permit more significant advances in production occupy an even smaller place in the sphere of technical creativity.

The first thing that might be assumed is that the process of invention is successfully developing in the hands of specialized state institutions: scientific-research, planning-design, and technological institutions. Their staffs include a number of important scientists and educated and talented specialists. However, in certain institutes, work is not being conducted very actively.

The development of the invention process should be aided by state plans for new technology. According to these plans, enterprises are obligated within prescribed periods to assimilate new types of products, to introduce progressive technology, and to fulfill tasks for mechanization and automation of production processes. However, analysis shows that the main causes lie in delay in construction of the technological facilities necessary for the assimilation of new technology and in the tardy preparation of production for serial manufacture of products. How much we lose for lack of equipment and replacement items or poorly prepared technical documentation!

All of this permits one to conclude that even specialized organizations -- institutes and institutions and technical services of enterprises -- have still not revealed their "invention potential." The former lose out because they are compelled to be "leashed" to the existing technology of a branch of industry, and the latter stand idle because of interruptions in supplies and equipment.

But how can we then explain that even factory innovators do not give necessary attention to invention? Certainly they well know the specifics of production and its "bottlenecks" and they have the opportunity to test their developments at their own enterprises. I have talked about this many times with managers of a number of scientific-technical societies of Leningrad, Kuybyshev, and L'vov. It turns out that there are good reasons behind innovators' weak interest in invention. One of the chief reasons is the absence of serious scientific-methodological management. Administrative-technical services of the enterprise, because of the pressures of operations, are not in a position to manage the invention activity of the collective. As for creative cooperation between factories and scientific establishments, despite the definite accumulation of experience, these relationships often have a nonobligatory character and are built on a voluntary basis. Innovators must "stew in their own juice" and this lowers the validity of developments and it is more difficult to expect to carry innovations up to the level of inventions.

It is not easy to attain an author's certificate for invention, but it is still more complicated, apparently, to introduce an innovation at one's own enterprise. Rationalizers' proposals that have been developed within the walls of a factory as a rule are rarely included in the plan for new technology. The introduction of innovations arising within a collective is as if it were a private affair about which no one asks. Their assimilation is unavoidably tied with the rearrangement of equipment which, in turn, causes down time in the work. If it is accomplished within the planning system, then the corresponding production lots are usually freed from the plan. When the assimilation takes place outside the plan, it is impossible to manage without overtime work. But the collective itself does not always agree to this.

But it also happens like this: a factory has its own inventions and they are even included in its plan for new technology, but this does not gladden the managers. The reason is that the introduction of a new development often leads to a lower volume of end products and involves an increase in plan tasks in which the enterprise is not always interested.

As we see, there are today many substantial difficulties on the road to the development of inventions. How can they be overcome? First of all, in our view, it is necessary on the part of scientific institutions to arrange efficient, continuous, and qualified management over factory inventors. For this it is necessary to develop new organizational forms for cooperation between science and production. Such relationships must be stable and permanent. Definite steps in this direction have been made already. In

1976, interdepartmental scientific-production associations and associated intersector complexes began functioning in several regions of the country. Thus, in a number of oblasts in the Ukraine, as a result of activity by the L'vov Party Obkom, four intersector complexes were created: instrument building, machine building, geological-geographical, and agricultural. Within the framework of each of these, large-scale investigation is being conducted and, on this basis, technical ideas that have practical significance are being operationally assimilated.

With the adoption of the decree of the CPSU Central Committee and USSR Council of Ministers on the improvement of the economic mechanism, a real possibility arose for more rapid introduction of factory inventions. Henceforth, state plans, including those for new technology, will be formulated on the basis of engineering and economic considerations by enterprises and associations themselves. This means that the collective can directly participate in finding the best answer to the questions of the place and timing of their inventions.

According to active instructions of the State Committee for Inventions and Discoveries, innovations that permit the solution of tasks in the minimum time and achieve the greatest economic effect are to be the first to be applied in practice. Unfortunately, the mechanism for realizing this important directive has still not been developed: there are few specialists that have the qualifications to calculate the effectiveness of an invention, and the criteria for selecting and introducing the most urgent innovations are not clearly formulated.

It is also necessary to stimulate the economic interest of enterprises in the development of inventions. Definite experience has been accumulated by the Ministry of the Electric Equipment Industry. Already for a number of years that ministry has utilized as a chief indicator of industrial-economic activity the volume of commodity output at comparable prices. For items certified to be in the highest category of quality, a price is established that permits compensation for production costs connected with the assimilation of new products. Under these conditions, every worker of the enterprise has an interest in the development of inventions.

Of course, we must also search for other ways to stimulate the economic interest of collectives in hastening technical progress. It is known that for the development and introduction of inventions into production, rewards are given to their authors and to those who have provided substantial assistance to them. However, in the advancement of a factory invention, a wider circle of people participate whether desired or not: factory patent experts, laboratory workers, and members of independent organizations of scientific-technical societies and of the All-Union Society of Inventors and Rationalizers. Various equipment of the enterprise, such as test stands, is used in this work.

In short, an invention to some degree is the child of the whole collective. Therefore, in my view, it would be fair to encourage corresponding efforts by the enterprise, introducing with this object, let us say, such an arrangement as this: an economic organization using a "foreign" invention in its work is obliged to transfer to the organization that develops it a definite sum from its funds for financing inventions and rationalizations. These supplemental funds should not only compensate for developmental production costs, but also provide some profit. Incidentally, relationships of a similar type are practiced today in the Polish People's Republic and in a number of other socialist countries.

To realize more fully the immense creative potential of the workers is one of the most important problems of our economic and social development at the present stage.

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NOVOSIBIRSK PARTY CHIEF: INDUSTRY FAILS TO INTRODUCE NEW TECHNOLOGY

Moscow PRAVDA in Russian 30 Jun 80 p 2

[Article by A. Filatov, first secretary of the Novosibirsk obkom of the CPSU, in the column "Party Life: For the Leninist Style of Work": "A Taste for What is New"]

> [Text] At the June plenum of the CPSU Central Committee Comrade L. I. Brezhnev once again stressed, among the first priority tasks, the necessity for hastening scientific-technical progress. Much has been done in this respect during the years of the Tenth Five-Year Plan in Novosibirskaya Oblast. At enterprises, 35 thousand items of new technology have been introduced into production and more than 700 mechanized, semiautomated, and automated production lines and over 500 machine tools with computer program control have been installed. Savings just from the utilization of inventions and rationalizers' proposals have reached 212 million rubles. The present article tells about the experience accumulated by oblast party organizations concerning the hastening of scientific-technical progress.

A year ago I had the opportunity to be present at an original piece of manufacturing, in fact, one unique in the country. At the Novosibirsk railroad switch factory, a shop was put into operation for sealing crosspieces of railroad switches by an explosive method. In the fraction of a second, the surface of the core of the crosspiece acquires a new quality and the length of service of the piece increases by a factor of 1.5. In only a year in this shop, several thousand crosspieces have undergone treatment, and a large quantity of the steel has been saved that goes into their production.

To march in step with the times and introduce new engineering and technology into production more quickly is the task of each collective. And for enterprises of Siberia it is especially important. Our scale of production grows each year and, at the same time, a significant shortage of personnel is felt. That is why work connected with the introduction of scientific achievements attracts increasing attention from party committees and primary party organizations.

Recently, the party obkom received a stream of complaints about the instrument-building factory imeni Lenin, which was not fulfilling its contractual obligations. There were discussions about the reasons. And it turned out that a critical situation had arisen: in the shops, the equipment has become obsolete and improvement is needed in the organization of labor and the life of the workers.

I will note that it is usually complicated to resolve such problems. Not all collectives are that capable. In such cases, the party obkom has often had to turn to various administrative levels. A special commission of the ministry visited Novosibirsk and, only after that, was the decision made to render aid to the factory. Its fulfilment was put under strict control by the enterprise's communists. The main efforts of the party organization were directed toward the reorganization of production. The results? During the years of the five-year plan, over 2000 units of new equipment have been installed here, six complex mechanized shop sections and 13 production lines have been introduced, and the application of robots has begun. Today, the factory imeni Lenin is among the most advanced in the oblast.

Novosibirsk has great scientific potential and its proprietary utilization offers a solid economic advantage. But firmly established creative cooperation between production specialists and scientists helps achieve this. Here are examples from the practice of joint work by party organizations of the "Sibelektroterm" association and the All-Union Scientific Research Institute of Electrothermal Equipment. A plasma-arc furnace was built that received a gold medal at the Leipsig fair. Electron-beam devices have been created that are without equal for making steel ingots. As a whole, the association, with the aid of scientists, has assimilated and mastered more than 70 types of electrothermal equipment since the beginning of the five-year plan. This has saved the Motherland more than 70 million rubles.

Many other examples can also be given of active aid by scientists to production. I shall only cite the recommendations for the improvement of the production structure of the association "Sibsel'mash" developed at the Siberian Department of the USSR Academy of Sciences. The broad complex of "Sibir'" automatic control systems, created by the initiative of Academician G. Marchuk, allowed sharp improvement in the management of the collective. Now, scientists jointly with specialists are creating automatic control systems for production technology in the galvanizing, stamping, and casting shops. Electronics also helps to automate the designer's position and to set up control of warehouse administration.

The introduction of automatic control systems and robot technology has exclusive importance. Because of this, heavy labor more and more is being transferred to machines. Understanding the necessity and urgency of such work, oblast party organizations are engaged in it with special persistence. And the improvements are noticeable. Whereas, during the whole Ninth Five-Year Plan only two such systems were introduced in Novosibirsk, today there are 44. This work is going especially well at the aviation plant imeni Chkalov, the aviation plant imeni Lenin, "Sibsel'mash," and in the "Elektroagregat" association -- places where communists maintain continuous and close ties with scientists.

Party committees strive to generalize the best experience and to disseminate it as widely as possible. With this goal, councils to assist the hastening of scientific-technical progress have been created under party gorkoms and raykoms, and also technical-economic councils with the task of giving aid to institutions and enterprises on the introduction of the newest and most valuable technology. Just in Novosibirsk, 73 such commissions and sections, 79 bureaus of economic analysis, and more than 300 society design bureaus are operating.

Wide use is made by party committees of scientific-practical conferences, which develop recommendations on the most important problems in introducing the achievements of science and advanced experience. Already, the preparations for the discussions themselves are resulting in better and more accurate understanding of many problems. Collective opinion is becoming the basis for a large amount of work which has clearly visible prospects. Of important significance was the oblast scientific-practical conference devoted to the introduction at enterprises of complex quality control systems. And two months ago, on obkom initiative, problems were examined that relate to the further development of the oblast's productive forces. All of this makes possible the deeper orientation toward problems of scientific-technical progress and more purposeful party management of the economy.

The cultivation of a taste for what is new is aided by the creation in Novosibirsk of a university of science and technology. To the departments and six faculties of this university, which operates on a non-governmental basis, have come many important scientists of the USSR Academy of Sciences and its Siberian Department: M. Lavrent'yev, G. Marchuk, A. Trofimuk, S. Sobolev, A. Aganbegyan, A. Okladnikov, and others. The university has made a large contribution to the retraining and the upgrading of qualifications of specialists. Following its example, similar universities have been created in other cities and regions of the oblast and at a number of large enterprises.

Understandably, the introduction of the achievements of science and technology into production is also urgent for agriculture. At a recent plenum of the party obkom, there was a discussion of a complex program for increasing soil fertility during the coming five-year plan that was developed by scientists of the Siberian Department of the All-Union Academy of Agricultural Sciences. The realization of this program will permit a marked increase of agricultural production in the oblast.

We have had experience in conducting agriculture on a scientific basis. This is why, for example, the problem of feed production has been solved to a significant degree in Ordynskiy Rayon. Here are the very highest milk yields and livestock weights, and from here also is a stable fulfilment of plans for animal products. Such farms of the region as the kolkhoz "Bol'shevik" and the sovkhoz "Priobskiy" have become beacons for many. We are widely publicizing the experience of Ordynskiy Rayon. An oblast seminar of party raykom first secretaries and chairmen of rayispolkoms was organized at the "Bol'shevik" kolkhoz.

Last year, a special plenum of the obkom was held, where questions about the effectiveness of work of scientific institutions and the hastening of scientific-technical progress at plants and factories of the oblast were examined in detail. Participants in the plenum analyzed the shortcomings, as well as the successes achieved, in the utilization of existing scientific and technical potential.

The matter is given too little importance, for example, in certain construction organizations. Often, plans for the introduction of new technology are unfulfilled in the trusts "Otdelstroy," "Novosibirskpromstroy-2," and so forth. The managers of these collectives, S. Gurkin, I. Mishchenko, and others, underwent sharp criticism at the plenum.

Not long ago, a meeting of the collegium of the USSR State Planning Committee examined the contribution of the collective of the Siberian Department of the USSR Academy of Sciences to the development of the productive forces of Siberia. It was noted that the institutes at Akademgorodok had done much in this regard. Owing to their efforts, many useful mineral deposits have been revealed and economic substantiation has been established for the location of large new industries and for whole cities. At the time of the discussion at the State Planning Committee, an exhibit was organized showing some of the more interesting developments by the Siberians. But, unfortunately, around twenty of these still have not been applied in the economy, although their introduction promises a large economic effect.

Why does this happen? Why is it still such a very long road from the scientist's laboratory to the production shop?

We know that enterprises still are not always interested in the more rapid introduction of scientific and technical achievements. To the director of a factory, it is often more profitable to utilize old technology than to become engaged in the assimilation of new technology. To reorganize production, it is necessary to lower production output for a time and to take losses. And this is no way, as we say, to get a pat on the back. Measures relating to further improvement in planning and in the economic mechanism must completely eliminate such discrepancies.

The assimilation of innovations is also constrained by the poor experimental base of scientific-research institutes. There is little opportunity for experimental production. Therefore, many developments lie around inactive for years. Obviously, the time has come to think about how to plan more effectively the development of innovations and their introduction into production. For this, in our view, the central planning bodies and the USSR State Committee for Science and Technology must have closer local ties. Scientific-production associations must be further developed also.

The great surge of creative energy among oblast workers has been stimulated by the decisions of the June Plenum of the CPSU Central Committee. Everywhere, competition is building up under the slogan, "To the Tenth Five-Year Plan -- an all-out finish; to the 26th CPSU Congress -- a worthy welcome." The collective of the instrument-building plant imeni V. I. Lenin, for example, has pledged, on the basis of further introduction of scientific and technical achievements, to fulfil its five-year task relating to the volume of production and growth in labor productivity by 7 November. Increased obligations have been accepted also by the collectives of the factories imeni Chkalov, the construction administration "Sibakademstroy," the kolkhoz "Sibir'" of Tatarskiy Rayon, the sovkhoz "Maslyanninskiy," and others.

The bureau of the CPSU obkom approved the patriotic undertaking of the advanced collectives. Preparation for the congress will give a new impulse to creative initiative, for the investigations of scientists and practical specialists that are directed toward the improvement of production and the increase of its economic effectiveness.

Recently at Akademgorodok of the Siberian Department of the USSR Academy of Sciences, a national scientific conference was held on "The Development of the Productive Forces of Siberia." It took place under the banner of the well-known instruction by Comrade L. I. Brezhnev, made by him during a visit to Novosibirsk, "We must carry on further, to the point where the active role of scientists helps solve the problems of combining science and practice and at the same time aids the growth of the country's productive forces." The oblast party organization, anticipating the 26th CPSU Congress, is striving to hasten the introduction of scientific and technical achievements into production. The contribution of Siberian scientists to the development of the economy must be still greater.

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SPECIAL FUND FOR FINANCING NEW TECHNOLOGY DESCRIBED

Moscow PLANOVOYE KHOZYAYSTVO in Russian No 8, Aug 80 pp 82-89

[Article for discussion by V. Pokrovskiy, division chief of the State Committee for Science and Technology: "The Cost Accounting System of Organizing Work To Develop, Produce, and Introduce New Technology"]

[Text] The tasks of accelerating the development and introduction of improved machinery and equipment demand new forms of organizing this process, based primarily on elaboration and bolstering cost accounting (khozraschet) in the sphere of science and technology. The fundamental principles of cost accounting as a method of planned economic management do not preclude original forms of cost accounting relationships applicable to the special characteristics and conditions of the work of scientific research institutes and design bureaus.

The gradual transition of a number of industrial ministries to a new system of planning, financing, and economic stimulation of work related to new technology begun in 1969 promoted stronger cost accounting relationships among scientific institutions. The main criterion for selection of progressive types of articles and industrial processes and their introduction into production under the new system is the economic impact of their realization. As the principal form of planning and financing scientific-technical development within the ministry a system was adopted comprising schedule-orders (zakazy-naryady) that insure continuity and comprehensiveness in planning the stages of development, production, and introduction of new technology, planning of all material-technical resources and capital investment necessary to solve the problem, and participation by enterprises in working out the problem.

The ministries are forming unified funds for the development of science and technology (UFDST's) out of deductions from part of the profit from production and economic activities. The amount of capital put in a unified fund is determined depending on the volume indicators of production in the sector. In this way the amount of spending for science is tied to the results of a ministry's production and economic activity.

Material incentive funds at scientific research, planning-design, and technological organizations are envisioned for: sociocultural measures and housing construction; organizational development; bonus payments for the development of new technology depending on the total economic impact actually received in the national economy from its use.

The sectors that have been using this system of planning and economic stimulation for a significant time are enjoying accelerated growth in the efficiency of introduction of scientific-technical measures and production of high-quality output. In the electrical equipment industry, for example, the average annual growth in the national economic impact is more than 20 percent or roughly 1.2 billion rubles. The proportion of output bearing the state Mark of Quality within total production volume is several times greater than the USSR average. Each year 1,200-1,700 new types of articles are introduced, whereas in 1968 the total number was just 685 According to figures for the ministries the time of development and introduction of new technology has been reduced 20-40 percent in the Ministry of Electrical Equipment Industry, 30 percent in the ministries of Power Machine Building and Heavy and Transport Machine Building, and 1.5-2 times for certain major scientific-technical problems.

The positive working experience of the ministries that were switched to the new system of planning and economic stimulation led in January of this year to adoption of instructions for transferring the scientific research, design, planning-design, and technological organization, experimental enterprises, and science-production and production associations (or enterprises) of all industrial sectors to the cost accounting system of organizing work on the development, production, and introduction of new technology based on schedule-orders (or contracts).

This is one of the most important measures among the program of steps adopted to meet the requirements of the document "Basic Directions of Development of the USSR National Economic in 1976-1980" with respect to broad use of the target program method in planning. The necessity of an orientation to good final results and making achievement of these results more dependent on intermediate links, on the system of intrasectorial and intersectorial links, makes the broadening of the methods of target (program) planning and management natural and logical.

Target program planning insures the interdependence of the management system at all levels: national economy, sector, and primary element (scientific institutions, science-production and production associations and enterprises). The schedule-orders must become the most common form of realizing the principles of target program planning and management. The bulk of new technology will be developed and introduced on the basis of these documents.

Universal use of schedule-orders requires taking a number of steps to raise the level of cost accounting independence and organize the activities of sectors, associations, scientific institutions, and enterprises. Foremost among these steps is modifying the procedures for financing the development, production, and introduction of new technology. Financing must be organized so the resources are directed to work on scientific topics, scientific-technical problems, and projects which are oriented to good ultimate results for the national economy.

Experience shows that the cost accounting source of financing for new technology, the UFDST, meets these requirements. The UFDST is a fundamentally new form of financing spending for science and technology, based on a combination of centralized and cost accounting principles. Its development made it possible to establish concrete sources of financing and procedures for forming capital earmarked for the development and introduction of new technology. The intraministry schedule-order is now the basis for financing the work. Moreover, the formation of a unified fund is a major step toward formulating a system for financing scientific-technical progress on the basis of five-year plan assignments in conformity with cost accounting principles of management. The operational economic independence of the ministries with respect to spending for work on new technology has been enhanced because the unused part of the fund is not withdrawn and may be used in the next year.

The UFDST not only expands the operational economic independence of the ministries with respect to the use of capital for development and production of new technology but also insures unity of financing sources for work in the cycle from development to incorporation in production, allows operational redistribution of capital in stages of this cycle, and intensifies the accountability of ministries and scientific organizations for efficient use of the fund.

According to information from the Ministry of Electrical Equipment Industry, only by organizing start-to-finish planning on the basis of uninterrupted financing from the UFDST was it possible to develop and build the A-4 series of asynchronous engines in a short time (four years); the previous A-2 series took 12 years to develop and put in production.

Use of UFDST's increases the concentration of finance capital. For example, in the chemical industry the proportion of projects valued at more than 1 million rubles rose from 41 to 60 percent in four years. Small projects are generally carried out for other sectors based on economic contracts.

The unified fund also promotes a rise in the proportion of work that creates a backlog of scientific projects. Between 1968 and 1979 in the electrical equipment industry, for example, the backlog increased approximately 2.5 times, while from 1972 to 1978 it rose more than 1.5

times in heavy and transport machine building and almost four times in the chemical industry.

The source for formation of the unified fund is profit; only in isolated cases may prime cost operate as such a source.

At the present time the unified fund is a cost accounting fund only within the framework of the sector, because only some of the highly profitable enterprises and associations participate in its formation. The purpose of forming the UFDST is to afford the ministries the right to maneuver freely with capital depending on the need to use it for particular types of work. Therefore, it is not wise, as is sometimes proposed, to establish norms for distribution of fund capital by stages of the research-development cycle for a long period of time within the framework of the sector and the individual associations (or enterprises). This ratio should be determined by the sector itself according to its concrete needs at a definite period, in conformity with plans for scientific research and incorporation of new technology.

The formation of unified funds for the development of science and technology in the sectors is a necessary condition for widespread implementation of the cost accounting system of developing, producing, and introducing new technology on the basis of schedule-orders. By orienting the schedule-orders to achieving good final results the sectorial scientific organizations are switched to a system of payment for projects that are completed and accepted by the purchasers and the indicator of "economic impact from scientific-technical activities" ratified by the industrial ministries for associations and enterprises in the five-year plans of economic and social development is introduced in practice.

The Instructions on switching sectorial scientific research, planning-design, technological, and planning-surveying organizations to the system of payment for work that is completed and accepted by the purchaser show scientific institutions how to introduce planning for the volume of work completed and accpeted (not work underway) and set up a procedure for taking account of projects that are completed but not introduced in production. This establishes conditions for objective monitoring of introduction by higher-ranking bodies. They will determine if the results match the requirements envisioned in the schedule-order and identify the causes of delays in introduction or failure to introduce and the economic loss from this. Recording completed but not introduced work creates the prerequisites for planning accelerated introduction of such projects.

The system of payment for work that is completed and accepted by the purchaser significantly improves the efficiency of use of schedule-orders. It is important, therefore, that most of the scientific organizations be able to switch to this system in the first two years of the 11th Five-Year Plan.

It can be broadened in the future, certainly, to assignments for solving key scientific-technical problems by setting up a procedure in which capital is issued to ministries (departments), associations (enterprises), and organizations in the form of bank credit authorized by the State Committee for Science and Technology and handled by USSR Gosbank institutions.

The five-year plans of economic and social development for ministries, associations, and enterprises will plan indicators of the technical level of production and most important types of products produced as well as the economic impact from carrying out scientific-technical measures (this has already been done on an experimental basis in the electrical equipment industry, agriculture, and power and heavy machine building). With introduction of the latter indicator at all levels associations and enterprises have a stronger interest in the plan's including those projects related to new technology which will insure meeting the assignment established by the plan for economic impact. This also orients sectors, associations, enterprises, and organizations to development of schedule-orders for the projects that will provide the best final results.

The efficiency of new technology today, of course, is defined in the process of technical-economic substantiation during selection of the topic or program for inclusion in the plan. In most cases, however, the developers view this stage as a matter of substantiating inclusion of the topic in the plan. As a result the procedure for evaluating the efficiency of new technology is simplified, expenditures related to the new technology are usually understated, and the prospects for the extent of its use in the national economy are exaggerated. This approach often lead to new technology that costs significantly more than similar technology in use while it is just 20-30 percent more productive.

In our opinion, the new procedure for planning the volume of completed work and the economic results of introducing scientific-technical steps will greatly strengthen the incentive for management bodies, when making the decision to develop new technology and ratifying the corresponding schedule-order, to select new technology by the criterion of efficiency.

The schedule-order system makes it possible to concentrate the resources and efforts of the collectives of scientific institutions, associations, and enterprises on development of the more progressive scientific-technical ideas. This greatly facilitates the development of technology on a higher technical and quality level which has a greater national economic impact.

The head institutes have the paramount role in concentrating efforts on achievement of good final results as defined in the schedule-order.

A decision of the State Committee for Science and Technology has significantly broadened the administrative and economic rights of these institutes with respect to the following:

a. influence on organizations performing work jointly;

b. determining the volume of capital investment and material-technical resources when formulating plans for solving the appropriate problems;

c. selecting science leaders (main designers);

d. financing work on schedule-orders, programs, and assignments given to the head institution;

e. accepting work done by joint performers;

f. determining the efficiency and ceiling wholesale prices for new technology in the assigned special area;

g. establishing the amount of incentive payments to joint performers.

These steps will unquestionably have a positive effect on the rate of introduction of the cost accounting system of organizing work on the development, production, and use of new technology on the basis of schedule-orders, which will therefore affect the rate of performance of this work also.

The status of the schedule-order as the sole planning document comes from the fact that it is issued for multifaceted topics of the five-year (national economic and sectorial) plans for research, development, production, and introduction of new technology as well as for annual assignments and projects envisioned by these plans. When it becomes necessary during a five-year plan to develop new, multifaceted topics of national or sectorial importance, which are usually involved with development of a specific new item, material, or piece of production technology, a schedule-order is set up for the particular case.

In our opinion, when all the sectors have switched to the cost accounting system schedule-orders should also be issued for scientific research, experimental design, and technological projects of independent significance, not related to specific articles, industrial processes, and materials. It is wise to draw up contracts for work done by the organizations (enterprises) of other ministries and departments.

The schedule-order should stipulate: the assignments (jobs, stages) of the comprehensive topic and final results; the technical-economic parameters and specifications of the new technology being developed (including the ceiling price); time for development of the comprehensive topic (assignments, jobs, and stages); capital and resources (including capital investment) by years and total bonuses for fulfillment of assignments (jobs, stages). In our opinion it would be wise to establish standard stages of performance of work for the ministries and departments in conformity with this structure of schedule-orders for the development of articles, industrial processes, and materials and for scientific research, experimental design, and technological work. It is important here not only to take account of the characteristics of the particular sectors (and subsectors) and the experience already accumulated by some science-production associations such as Plastpolimer, Agropribor, and Pishchepromavtomatika, but also to insure that the standard stages of work done in the sectors correspond to the standard stages employed by the State Committee for Science and Technology in drawing up programs to solve key scientific-technical problems.

The technical administrations of the ministries can be charged with ratification of schedule-orders on topics which are comprehensive in nature and include all stages from research to incorporation of series production of the new technology, while all-Union industrial associations can ratify projects that carry out annual assignments of the comprehensive topic.

Changes in the topic list (specification of assignments, coordinating stages of work, their cost, times, and other parameters) should be made by the organization that ratified the schedule order, with the consent of joint performers of the topics (assignments, jobs, stages) who will be affected by the correction.

In our opinion, the ministries (departments) should give the head science-production and production associations and scientific research, planning-design, and technological organizations the right to issue schedule-orders for performance of jobs related to new technology and to ratify joint performers. This would enhance the accountability of these associations and organizations for fulfillment of work on the comprehensive topics assinged to them.

At the present time, only the associations and organizations of a given ministry that are responsible for development of the particular field of science and technology can act as the principal performer of a topic (who is also the holder of the schedule-order). But the broadening of intersectorial links in the area of developing and introducing new technology urgently poses the problem of planning work related to new technology on the basis of intersectorial schedule-orders. Their use will require significant changes in the rights and responsibilities of purchasers and performers and in methods of allocating and distributing financial and material-technical resources. Specifically, the head ministry (department) should be given the right to plan and redistribute all the resources allocated for performance of the assignments of an intersectorial schedule-order among the joint performing sectors.

In our opinion, it would be advisable to carry out local experiments in this area in the near future in oder to work out forms and methods of mutual relations among all participants in work based on interdepartmental schedule-orders. Later the sphere of actions of the schedule-orders could be broadened to include guaranteed servicing and repair of the technology built.

The organizations (associations) that issue schedule-orders and accept them for performance bear the full responsibility of purchasers and performers under a contract. The assignments of the schedule-order are obligatory for all participants in development of the topic, including industrial enterprises at which the developed results will be put into production. The assignments are the key constituent of the plan for introduction of new technology at the production association (enterprise). This principle should be stipulated in the Standard Methodology for development of the technical, industrial, and financial plan of industrial enterprises that have been switched to the new system of planning and economic incentive.

It is contemplated that measures related to the production and introduction of new technology will be included in plans for production and capital construction. During substantiation of drafts plans for associations (enterprises), data on the organizational-technical level of their production apparatus, the availability and level of utilization of capacities, recent history of technical-economic indicators, and other such information is taken into account. The Statute on the Passport of the Production Association (Enterprise) offers good opportunities for fuller consideration of this information when formulating the assignments of schedule-orders.

The ceiling price is a very important parameter of the schedule-order. Inasmuch as prices for new technology are shaped basically from consideration of prime cost and normative profitability, it is the customer who will benefit from use of a ceiling price in most cases. In our opinion, the USSR State Committee for Prices should insure that ceiling prices new technology are set depending on the degree of improvement in use qualities it provides and the level of social costs of production. Then associations and enterprises will have incentive to replace and modernize their products at the proper time.

The transition to the system of schedule-orders presupposes rational use of scientific cadres. This requires improvements in certification and competitive selection of scientific workers, tying the period of their appointment to the time required for performance of specific work under the schedule-orders. The level of pay and incentive should be set depending on their certification.

The schedule-order defines the amount and sources of material incentive. This enables each employ to know in advance the amount of incentive payments and to relate them clearly to final results achieved. Economic stimulation of the collectives of workers who perform the assignments of the schedule-order should be based on the principle of giving them a right to receive part of the economic impact (profit) which they helped create.

In a number of sectors of industry the economic stimulation of scientific organizations and material incentive of their workers are directly dependent on the economic impact in the national economy resulting from use of the new technology, based on cost accounting relations among participants in the process of research-to-production. This practice can also be applied where schedule-orders have been introduced on a large scale, but on the condition that the performers of the work bear legal and economic responsibility for the parameters of the new technology which they guarantee and that purchasers bear the same responsibility for getting economic benefits from timely production and introduction of the technology. The last-mentioned consideration is especially important, because at the present time the economic potential of new technology is not used adequately in the national economy.

The question of the economic accountability of the performer and purchaser organizations can be solved, we feel, as follows. The amounts of stimulation of performers should be made dependent on compliance with the parameters (including economic impact) of the technology under development. In dealing with purchasers, it is possible to deduct the sums owing for bonus payments to performers from their bonus funds regardless of the actual volume of use of the new technology.

To prevent workers of particular sectors of the national economy from employing suboptimal decisions (where the desires of other sectors are considered secondary), it would be wise to authorize the managers of enterprises and organizations to transfer part of the capital in the centralized bonus fund for the development and introduction of new technology to other enterprises and organizations (regardless of their departmental affiliation) to pay bonuses to the workers who took part in the development of new technology contemplated by the national economic and sectorial plans. The ministries, departments, and kray and oblast executive committees should also be allowed to use part of the capital in this fund (for example, up to 10 percent) for bonus payments to administrative employees of the associations, combines, trusts, ministries, and departments who see that plans of work related to new technology are carried out.

The use of schedule-orders not only improves the efficiency of the new machinery and equipment being developed, but also has a beneficial effect on the productivity of scientific organizations, associations, and enterprises in development and use of new technology. This is because use of the schedule-order system demands adequate organization of work at the scientific research institutes, design bureaus, science-production associations, and enterprises.

The comprehensive creative brigade is a progressive organizational form for rapid reorientation of collectives to solving the pressing problems of production and introduction of new technology. At the Soyuzgazavtomatika Science-Production Association, for example, these brigades are composed of scientists, designers, and production workers who serve in them for the period of development and construction of the specific automated gas supply system. Material-technical and financial resources are provided by plan. The basic indicator used to evaluate the work of the brigade is turning over the completed work to the purchaser at the scheduled time; after this the brigade is disbanded or reorganized to perform a new project.

The degree to which a sectorial scientific institution works on schedule-orders (while fulfilling its pure, exploratory, and self-initiated projects in the established manner, of course) can, it seems to us, be used to characterize the extent of its orientation to the most important problems. Analysis of the concentration of efforts by scientific organizations on schedule-order jobs would enable the State Committee for Science and Technology, ministries, and departments to take steps toward a substantial improvement in their networks of subordinate institutions. Special attention here should be given to shutting down organizations, branches, and divisions that are not working efficiently and transferring them to the control of science-production and production associations (enterprises).

Thus, the transition of sectors to the cost accounting system of organizing work related to the development, production, and introduction of new technology demands implementation of a set of steps to pick out the subjects of the most important and highly efficient projects, formulate schedule-orders for them, and introduce a single source of financing for all the work in the cycle of research, development, and incorporation in production. This program also presupposes institution of payment for scientific research and development work that is complete and has been accepted by the customer. At the same time, the organization of work on schedule-orders must be substantially improved: enlarged rights for head scientific research institutes; broader introduction of flexible organizational structures; improved use and certification of scientific workers; incentive for collectives that are developing and introducing new technology.

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'PRAVDA' LAUDS L'VOV'S WESTERN SCIENTIFIC CENTER'S WORK

Moscow PRAVDA in Russian 29 Aug 80 p 1

[Editorial: "The Interaction of Scientific Efforts"]

[Text] The scientists of Siberia are actively carrying out a complex scientific program aimed toward the rational utilization of natural resources of this huge region and the development of its productive forces. In the Ukraine, a council has been created for the coordination of scientific research of academy, ministerial, and also educational institutes located in Vinnitskaya, Zhitomirskaya, Kiyevskaya, Khmel'nitskaya, Cherkasskaya, and Chernigovskaya Oblasts, and this council has completed the formation of a network of scientific coordination centers for the basic regions of the republic. These and other facts are evidence of the close interaction of scientists, engineers, and leaders of production and of their efforts to hasten the tempo of scientific and technical progress in light of the decisions of the 25th CPSU Congress.

This work has acquired great momentum in recent years. An integral part of its plan have been 200 complex goal-oriented programs. In correspondence with these programs, there have been created about 2000 new types of technology and consumer goods, about 1000 progressive technological processes, more than 900 types of materials, and about 700 automatic control systems. To accomplish these programs, the efforts of specialists from various agencies were combined. The primary organizations of scientific-technical societies of almost 3000 institutes, design bureaus, and enterprises concluded contracts for creative cooperation for the realization of complex programs.

Close interaction of scientific efforts responds to the special characteristics of the present stage of scientific development, and the complex approach to the study of problems is being confirmed even more as a necessary condition for correctly organized scientific investigation. This responds also to practical interests: industrial and agricultural production expects carefully substantiated, deeply and thoroughly weighed recommendations from scientists. Thus, the Central Committee of our party approved the initiative of 28 Leningrad production and scientific collectives that had accepted joint obligations for the creation of the Sayano-Shushenskaya Hydroelectric Station with a short time schedule and at a high technical level. A scientific association has emerged within the system of the RSFSR Ministry of Higher and Secondary Specialized Education. The tasks of this association, which operates under the cost-accounting system, include the concentration of efforts of researchers on the most important topics and the hastening of introduction of higher-school scientists' achievements into production.

Cooperation between economic centers and between regions has borne good fruit. This can be seen in the example of cooperation between the academies of science of Belorussia and Lithuania. It is conducted at various levels with participation by over 30 institutes. An interacademy commission has been formed to coordinate joint activities and projects are carried out according to the five-year plan.

"We have set for ourselves a fundamental task of raising the effectiveness of production and quality of work," noted Comrade L. I. Brezhnev at the June (1980) Plenum of the CPSU Central Committee. "It must be continuously in our field of vision. It is also necessary to think further about how to hasten scientific and technical progress . . . "

A big help in this matter is an efficient arrangement for the interaction of scientific efforts. Ministries and agencies, academies of sciences for republics and economic sectors, and the USSR State Committee for Science and Technology are asked to be concerned with the effectiveness of such arrangements. Also, further expansion must take place in the role of the USSR Academy of Sciences as the center of theoretical research and as coordinator of all scientific work in the country.

In this matter, much depends on the support of party organizations and their continuous concern for concentrating scientists' and specialists' attention on the main-line trends in scientific and technical progress. Thus, in Krasnoyarskiy Kray, technical-economic councils that include leading specialists and scientists are active under the kraykom, obkom, gorkoms, and raykoms of the CPSU. A council for the coordination of scientific research has been created under the Tomsk obkom. Interdepartmental scientific-production complexes, managed by the Western Center of the Ukrainian Academy of Sciences, have been put on their feet through active participation by party committees of L'vovskaya Oblast. They deserve a large part of the credit for the fact that the economic effect from introducing innovations here in recent years has grown several times.

The tested means for improving the coordination of the activities of scientific organizations is socialist competition. Scientists of the All-Union Institute of Electrical Engineering imeni V. I. Lenin addressed fellow collaborating organizations with a call to work with the motto: "High effectiveness is collaboration with the workers next door!" The call to Muscovites has been supported by dozens of factories, scientific research institutes, design bureaus, and institutes of the USSR Academy of Sciences that have accepted contractual obligations.

At the same time, valuable experience does not everywhere actively fight for adoption. In various fields of science and technology there are still many gaps in the coordination of research. Poor practice persists, when even within the framework of one higher educational institution or scientific research institute, the departments and laboratories work for themselves and are not tied to one another by a unified plan. Often, research is unjustifiably duplicated. This has happened with industrial robots; a number of incomplete designs have been put into serial production. The USSR State Committee for Science and Technology, the USSR State Planning Committee, the USSR Academy of Sciences, and the USSR Ministry of Higher and Secondary Specialized Education are supposed to formulate and establish a complex program of projects for creating and assimilating automatic manipulators during the period from 1981 to 1990.

Improvement must be made in the administration of research related to maximum full utilization of mineral resources. We cannot tolerate the losses caused by bureaucratic approaches to extraction and processing. In the dumps of enterprises of the chemical industry and nonferrous metallurgy on the Kola Peninsula and in other regions, valuable minerals turn up and are often irretrievably lost. And yet, the designs for such "one-sided" production arose in the institutes, and the fruits of their labor were assessed by expert scientists . . . We must increase the share of research oriented toward the complex utilization of mineral wealth and arrange interagency cooperation both in studying problems and in building enterprises that provide for processing raw materials without waste.

The concentration of efforts and resources on the main trends increases the potential of Soviet science. Good experience in organizing research has been accumulated in academy institutes, ministerial scientific research institutes, and higher educational institutions. It is an important task for the managers of scientific institutions, party and independent organizations, ministries, and agencies to disseminate this experience widely and to apply it creatively.

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ARMENIAN GOSPLAN OFFICIAL: CENTRALIZE REGIONAL R&D ADMINISTRATION

Moscow PRAVDA in Russian 27 Apr 80 p 2

[Article by Professor G. Khachatryan, director of the Armenian branch of the Scientific Research Institute of Planning and Norms of the USSR State Planning Committee and doctor of economic sciences, Yerevan, in the column "Management: Science and Practice": "Degree of Return"]

[Text] In recent years, managers of production associations have persistently striven to create their own design base. This call to technical progress might well be welcomed. However, has such a trend always proved necessary? I think not. Often, it seems to be a kind of reaction to insufficient mutual relationships between factory specialists and reputable institutes resulting from insuperable administrative barriers.

Why darken strange door steps or go with hat in hand to a cooperative ministry? Better and more convenient to create your own institute and unite the efforts of science and production within the framework of one enterprise. Such is the reasoning of the administrator.

Let us try to look at it from the position of the whole region. Let us take Armenia as an example. Here, about thirty thousand workers are employed in scientific research institutes, special design bureaus, and laboratories of higher educational institutions. Essentially, already today, for each five industrial collectives in the republic there is one scientific research organization or design bureau. How can such a large scientific-technical potential be used? The end results of production do not give grounds for satisfaction.

It is generally recognized that the effectiveness of cooperation between scientists and factory specialists is more meaningful where production invites the most progressive innovations. For example, during the last three years, all items developed by the All-Union Scientific Research Institute of Complex Electric Equipment and assimilated by the "Armelektromash" association were awarded the state Mark of Quality. There are many good examples. But this is what is alarming. From the beginning of the Tenth Five-Year Plan, only 30 to 40 percent of the developments done by research institutions received a start in life. The yearly economic effect of each applied innovation was on the average 32 thousand rubles. A conclusion is suggested: numerous scientific organizations still do not have enough influence on industrial practice and the degree of return from their efforts is low. Why?

The analysis of the status of scientific services in two leading economic sectors showed the following. The All-Union Scientific Research Institute for Complex Electrical Equipment and divisions of the All-Union Scientific Research Institutes for Electrical Mechanics and for the Cable Industry are operating in the republic. At the same time, such large industrial associations as "Armelektrosvet" and "Armelektroapparat" remain outside the gravitational sphere of electrical engineering institutes which, of course, is reflected in the level of their production. Another example: in seven scientific institutions and organizations subordinate to the USSR Ministry of the Chemical Industry, more than 1,400 people are working. Simultaneously, in five institutes and laboratories of the Armenian Academy of Sciences, another 1,450 specialists of the same type are working. However, our chemists, alas, cannot boast of successes.

Many large enterprises -- tire and rubber technology and other factories -- do not have any scientific support from within the region. Half of the thematic developments of subordinate scientific units of the electrical engineering and chemical industries are destined for introduction into production outside the boundaries of the republic. At the same time, half of the materials and products of these sectors worked on by institutes located in other economic regions. Is such a position right? It is doubtful.

We are disturbed also by the circumstance that scientific organizations located in Armenia even in one economic sector do not try to work out a single technical policy that takes into account the interests of the economic development of the republic. How can this disorder be overcome? One of the most likely variants for increasing the return from scientific-technical potential is the centralized scientific service of industry on a territorial principle. In our view, it is more effective and advantageous to specialize local enterprises in correspondence with the character of existing scientific institutions and not create all new institutes and their branches.

Until now, the opinion has prevailed that the emergence of scientific institutions is dictated by interests of developing industry, its level and scope. Such an approach was thoroughly logical inasmuch as the scientific base lagged industry for some time. Now, more often the situation is the reverse. Industrial enterprises often do not keep step with scientific-technical progress, which restrains the introduction of effective innovations. This means that we need to rearrange relationships between the two. Let science everywhere show the way to administrative practice.

Studying the problem of the influence of scientific developments on production, we have come to the conclusion that many institutes have insufficient interrelationships because of administrative barriers. Meanwhile, the greatest effectiveness is achieved through a complex approach to the solution of problems and through creative teamwork by research institutions of related economic sectors. New ideas and optimum ways of realizing them can arise in the process of joint work. At present, scientific subordinate units at enterprises are often adapted to local industrial tasks. Far from all workers have appropriate specialized training.

One of the chief reasons for the low return from scientific potential is that many technological, organizational, and other tasks of the same kind are solved in parallel in several institutes and laboratories. Because of administrative confusion, the Armenian Academy of Sciences is not in a position to bring about active coordination and to organize complex research on the territory of the republic. Much extra time goes into overcoming difficulties and in conducting experimental-design work. It seems that the cost-accounting system for the creation, assimilation, and introduction of new technology on the basis of order-commissions (contracts) should become the basic form and method for mutual relations between economic-sector and territorial scientific-technical centers and industrial enterprises in regions. Such centers can carry out internal specialization and cooperation. Methodological management on large problems can expediently be assigned to head institutes. For rational planning and management of scientific developments by region, it is necessary also, it seems, to create a coordinating body. Similar experience, as is known, has fully proved itself in the Ukraine.

The regional centralization of management of scientific exploration allows for the successful solution of tasks put forth by the decree of the CPSU Central Committee and the USSR Council of Ministers on the improvement in the economic mechanism. We believe that it is already necessary to conduct a careful analysis of the scientific-technical level and technical-economic parameters of products being manufactured by industry of economic regions and to form the basic long-range plan for the development and manufacture of new types of end products. Secondly, plans of scientific research should approach in profile those types of goods, the mass production of which in the republic or oblast can be arranged in the shortest time.

The system of scientific developments must not only consider the specifics and the character of scientific activity, trends in the development of science and technology, but also at the same time to be a moving force in the development of the productive forces of the region. Then, the return from science and its effectiveness will sharply grow.

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KIEV GOSPLAN OFFICIAL DESCRIBES R&D ADMINISTRATION IN REPUBLIC

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[Article by V. Shevchenko, chief of the summary department for science and new technology of the Ukrainian SSR State Planning Committee, and V. Ruban, candidate of economic sciences: "The Control of Scientific-Technical Progress in the Republic: Automation Experience and Problems"]

[Text] Putting into practice the decisions of the 25th CPSU Congress, the Ukrainian SSR has achieved significant rates of scientific-technical progress. Electrification, complex mechanization and automation, chemicalization, the application of new types of raw-material and industrial resources, the modernization of equipment, the creation and rapid assimilation of the production of new machines and mechanisms, instruments, and apparatuses, and the introduction of advanced technological processes -- these are the basic trends of scientific-technical progress at the present stage of development. A decisive role in scientific-technical progress as a factor of growth of effectiveness and intensification of production in the Tenth Five-Year Plan was stressed at the October (1976) and November (1979) Plenums of the CPSU Central Committee and at the November (1976) and October (1979) Plenums of the Ukrainian Communist Party Central Committee.

The special characteristics of the Tenth Five-Year Plan for the development of the economy of the country, which are chiefly related to all-out intensification and improvement in the effectiveness of production, found reflection in the plan for the development of the economy of the Ukraine. In 1980, the national income of the republic should increase in comparison with 1979 by 3.5 percent, or 2.7 billion rubles, and 86 percent of this growth is planned to come from increase in labor productivity. By the end of 1980, it is anticipated that the output of industrial goods with the state Mark of Quality will increase to 9.5 thousand types.

From 1976 to 1979, about 80 enterprises, over 1000 shops, and about 6000 works and work stations have undergone complex mechanization and automation, and about 10,000 mechanized production lines have been put into operation; this exceeds the number of units introduced during the Ninth Five-Year Plan by 20 percent. In addition, 130 thousand units of various equipment have been modernized. The introduction of the achievements of science and technology and the further supply of mechanized and automated means to production processes will, during the years of the Tenth Five-Year Plan, allow an increase in the proportion of workers engaged in mechanized labor from 46 percent in 1975 to 50 percent, which will make possible the transfer of about 300 thousand workers from manual labor to mechanized labor.

As V. V. Shcherbitskiy noted in his speech at the October (1979) Plenum of the Central Committee of the Ukrainian Communist Party, two thirds of the growth of civil labor productivity came from the introduction of the achievements of scientific-technical progress.

However, considering the demographic situation that is building up, the rates of scientific-technical progress that have been achieved today cannot be considered sufficient for further intensification of all civil production. Therefore, our country is implementing a complex of measures related to the investigation of factors and reserves for hastening scientific-technical progress and putting them into operation.

One of the decisive factors for hastening scientific-technical progress is the improvement of management and, in first priority, planning and the economic mechanism, which was described very convincingly in the decree of the CPSU Central Committee "On Further Improvement in the Economic Mechanism and Tasks of Party and State Organizations" and in the decree of the CPSU Central Committee and USSR Council of Ministers "On Improving Planning and Strengthening the Influence of the Economic Mechanism on Increasing Production Efficiency and Work Quality." In accordance with the latter decree, which contained concrete instructions for improvement of all planning work, the process of putting together economic plans is beginning with the development of long-term, complex programs for scientific-technical progress. In this, a significant role is allotted to broadening program planning at all levels of managing scientific-technical progress. Also provided for is the strengthening of the stimulating role of the unified fund being created in the ministries for the development of science and technology out of profits. As indicators being approved for five-year plans for economic and social development, the following is prescribed for industrial ministries, associations, and enterprises:

> basic tasks for fulfilling scientific-technical programs, for development, for assimilation and introduction of new highly effective technological processes and types of products;
>
> basic indicators of the technical level of production and most important types of products being produced;
>
> the economic effect from the realization of scientific-technical measures; and

standards for forming a unified fund for the development
of science and technology (for ministries).

In his speech at the October (1979) Plenum of the Central Committee of the Ukrainian Communist Party, V. V. Shcherbitskiy, among a number of basic tasks for increasing the effectiveness and quality of all work, singled out improvement of work on introducing the achievements of science and technology.

The State Planning Committee of the republic systematically analyzes the scientific-technical level and degree of completeness of scientific research work. Results of the analysis provides evidence that ministries and agencies still do not sufficiently direct the activity of their subordinate organizations to the solution of the most important, first-priority problems, to the investigation and development of conceptually new products, to progressive technological processes, and to up-to-date equipment for mechanization.

In 1977 and 1978, the Ukrainian State Planning Committee examined more than 100 institutes and design bureaus, including 35 of union subordination. It was established that there is still limited acceptance of the "Procedures for Evaluation of Scientific-Technical Activity of Scientific Research, Planning-Design, and Planning-Technological Organizations." As a consequence, part of the scientific work being done ends with the preparation of various recommendations and instructive materials which do not provide a significant increase in labor productivity or technical level of production and quality of products.

In separate ministries and agencies of the Ukrainian SSR the uniform procedures established in the country for acceptance and evaluation of completed scientific-technical developments are not being observed. This permits developmental personnel in a number of instances to report as finished work, work that actually needs revisions. In evaluating the level of completeness of scientific research work, it is often ignored that scientific-technical development as a whole is considered complete when corresponding tests have been conducted, when there is acceptance of new types of products or technological processes by agency and interagency commissions, and the necessary recommendations have been given for their assimilation and utilization in the economy.

Apart from those examined, the republic State Planning Committee systematically is working out and implementing a whole system of measures for hastening scientific-technical progress. In particular, in the current five-year plan, a complex of such measures has been provided for in a number of decrees by the Ukrainian State Planning Committee, which affect questions of raising the effectiveness of utilizing scientific potential, improving planning, and strengthening control over the development of science and technology in the republic, and others.

In order to have maximum effect from the measures being applied, they all must be placed on a strictly scientific basis. An important role in creating such a basis is played by the broad introduction into practice of the management of the development of science and technology by mathematical-economic methods (EMM).

In our republic, certain experience has been accumulated in introducing EMM and SVT (computer technology means) for planning and control in the development of science and technology. In 1976, a complex for calculating analytical reference information on expenditures for new technology measures and their effectiveness was put into use in the composition of the first round of ASPR [Automated Control System for Planning Calculations] of the Ukrainian State Planning Committee, in the subsystem "Introduction of the Achievements of Science and Technology into the Economy." This complex consists of 46 tasks, including 23 tasks being accomplished on a yearly cycle of planning and 23 tasks, on a five-year cycle. As a result of their accomplishment, 22 output tables are being formed for each of 55 ministries and 25 oblasts of the republic. The indicators contained in them (their volume approaches 500 thousand) define the scale of introduction of new technology and corresponding expenditures, serve for the determination of the effect of new-technology measures on the growth of labor productivity and savings from lowering the cost of production, permit the estimation of expenditures on scientific research and experimental-design work in industry, and so forth. Along with the enumerated indicators, which are determined for a series of years of the period being analyzed, the output information also contains their basic dynamic characteristics. All of this permits effective use of the results of the accomplishment of the tasks of the complex in the tabulation of projected yearly and five-year plans under the heading "Development of Science and Technology."

On the basis described, the republic State Planning Committee jointly with its subordinate scientific research organizations in 1978 developed the "Methodological Recommendations for the Analysis (Using Computers) of Expenditures on New-Technology Measures and Their Economic Effectiveness" and sent these recommendations to ministries and agencies of the Ukrainian SSR for practical application in analyzing the effectiveness of introduction of new technology. In 1979, a standard design solution (TPR) for introduction into the composition of ministerial automated systems of republic ministries and agencies was prepared according to the complex being examined. The given TPR can be used also in other union republics. Its dissemination allows, first, the curtailment of the period for introduction of ministerial automated systems into ministries and agencies and, secondly, to substantially reduce expenditures on the development of these tasks for the republic as a whole.

Further ways to develop work on the automation of the control of scientific and technical development are defined by the decree of the Central Committee of the Ukrainian Communist Party and republic Council of Ministers "On Certain Measures for Further Improvement in the Control of Scientific-Technical Progress in the Republic." Along with broadening functions and rights, the Ukrainian Communist Party Central Committee and the Ukrainian Council of Ministers with this decree obligated the republic State Planning Committee to provide for the development of a Republic Augomated Control System for Science and Technology (RASUNT), oriented toward the solution of basic problems and the accomplishment of the task of control over scientific-technical progress. It includes systems for forecasting scientific-technical potential (ASPP), planning calculations for science and technology (ASPR-NT), control over formulating and implementing scientific and technical programs (ASUPr), and also a center for exchange of current information on the technical level of production, demands by economic sectors for scientific research, and on developments being conducted and subject to introduction into production (TsOTI).

Guided by the decree mentioned, the Ukrainian State Planning Committee jointly with the Main Scientific Research Institute and Computer Center of the Ukrainian State Planning Committee and the Institute of Cybernetics of the Ukrainian Academy of Sciences, prepared a technical task and program for creating and introducing the first round of RASUNT in the Ukraine and also a number of documents for effective organization of processes of long-range planning and introduction of systems which were approved by the decree of the Ukrainian State Planning Committee. Projects have been extended in preparation for the introduction of the first round of the system, which is scheduled to be put into operation the first half of 1980.

The State Planning Committee and the Presidium of the republic Academy of Sciences, the Institute of Cybernetics of the Ukrainian Academy of Sciences, the Main Scientific Research Institute and Computer Center and the Scientific Research Institute of Economics of the Ukrainian State Planning Committee have all taken part in the creation of RASUNT, and the ministries and agencies of the republic are carrying it out.

The purpose of creating RASUNT for the Ukraine is to raise the quality of control over science and technology by substantially improving the process of modeling factual, anticipated, and required status of the objects of science and technology by means of systematic application of mathematical-economic models and up-to-date computer technology, which permit objectivization and also raise the precision and operability of management decisions.

To achieve this aim, it is necessary to solve a number of conceptual problems on the structure of the system. Among these are:

> construction of an organizational-technological mechanism of control over the development of science and technology, which is based on the actual methodology of control but which uses new possibilities which appear in connection with the use of mathematical-economic methods of forecasting, optimum planning, and others; is based on up-to-date computers with high-speed capabilities for information handling, with a large volume of memory devices and powerful mathematical-program apparatus; and is based on peripheral displays for the user to communicate with the computer. The latter, in a dialog mode, will allow making rational control decisions based on information on the condition of the objects of control preserved in the machine's memory, and others.

coordination, based on new technological, informational, and mathematical means, of all levels of control over the development of science and technology in a unified system with consideration of intersector, sector (agency), geographical, and program cross sections;

coordination into a unified system of all groups of indicators representing subject fields of control that describe content-goal, process, object, and resource components of the process of development of science and technology;

the guarantee of functional complexity, which consists of the unification of all functions of control into a closed circuit, beginning with plan development and ending with consideration of the actual status of the object; and

the coordination and guarantee of the continuity of long-range, five-year, yearly, and other shorter periods (levels) of control on the bases of the new means mentioned above.

Problem-goal oreientation and the continuous development of the object of control and the means of control, which make the creation of RASUNT as a one-time act impossible, has insured its construction as a developing, hierarchical system of many links. At the same time, RASUNT is being built as a subsystem of the Republic Automated System for the Collection and Analysis of Information (Ukrainian RAS) on the one hand, and as a geographical link of USSR ASUNT, on the other. Such a role for RASUNT within the framework of more large-scale systems, requires the guarantee of its mutual interaction horizontally with ASPR, ASGS [Automated System for State Statistics], and other subsystems of the Ukrainian RAS, and also vertically with automated control systems of the State Committee for Science and Technology, the automated control system "Invention," and other subsystems of the USSR ASUNT. The internal structure of the Ukrainian RASUNT is characterized by its organizational, functional, supply, and technological sections.

The structure of the organizational section of RASUNT is oriented toward the solution of problems of system coordination among the levels and actual bodies of control in relation to the new automated technology of information processing. Therefore, the organizational section simply corresponds to the structure of the bodies for control of the development of science and technology and its pertinent objects of control for various economic levels of the republic with consideration of the intersector, sector (agency), and geographical cross section of control. An element of the organizational section of RASUNT is the link, which represents a system consisting of the body (subject of control) and the object of control that corresponds to it. The levels of links can be distinguished in the system: the upper -- the link of intersector level; the middle -- the sector (agency) and the geographical; and the lower -- the level of enterprises and organizations.

Ukrainian RASUNT as a whole, as well as each class of links and each separate link, is characterized by single typical composition of functional, supply, and technical system sections.

The structure of the functional section of RASUNT is oriented toward the solution of problems of coordination in the organizational, subject, functional, and time cross sections of all subject fields of control which describe, as shown above, the goal, process, objective, resource, and other components of the development of science and technology. These components, under existing conditions of control over scientific and technical development, are reflected as subsections of the plan for scientific and technical development. In particular, the goal area of control is reflected in a subsection that describes tasks for the solution of basic scientific and technical problems; the process area -- by the subsection that describes the process of introducing new types of products and assimilating their production, the introduction of progressive technology, and so forth; the subject area -- by the subsection on the introduction of computer technology, efficiency, and so forth; the resource area -- by the section on financing scientific research work and on the training of scientific and scientific-teaching personnel. One must note that it is characteristic for the republic level of control that there is a high degree of centralization of control in the cross section of the subject areas. In particular, in contrast with the union level, where the State Committee for Science and Technology, the State Committee for Standards, and other interagency bodies participate alongside the USSR State Planning Committee in the development of plan subsections, in the republic all subsections of the plans for scientific and technical developments are formulated by the Ukrainian State Planning Committee.

Following the problem orientation described above, the functional section of RASUNT is built as an organizational aggregate of functional structural units (FSYe) of various levels of the hierarchy which are united into a system according to the commonality of their assignments, consisting of modeling in the time, organizational, subject, and functional cross sections of conditions attending the process of scientific and technical development as an object of control. Among FSYe's are subsystems, control complexes, blocks, subblocks, complexes of tasks, and tasks. Guarantee of the completeness of FSYe's is achieved with the aid of a matrix model of the functional structure of RASUNT, the analysis of which permits defining the field of systems tasks, which embrace all subsystems in a complex manner, subject fields of control, and links of the system with consideration of their specifics.

Structuralization of the process of control over the development of science and technology has permitted the distinction of the following groups, typical for all links of RASUNT, of the functions of control and their corresponding functional subsystems:

> forecasting -- the process of modeling the conditions required in the future for the development of science and

technology, based on the necessary end economic results; of modeling the anticipated condition of science and technology on the basis of objective trends in their development; of modeling anticipated deviations of the actual from the desired condition of scientific and technical development. In correspondence to the enumerated processes of modeling, subsystems are divided into goal-, research-, and control-forecasting;

planning and statistical analysis of plans -- the process of modeling the desired future condition of scientific and technical development with consideration of goal forecasting (demand by the economy for scientific and technical objects) and the internal possibilities of science and technology, and also the accumulation of plans for the previous period and comparisons of plan indicators of each successive plan period with the previous ones;

Norm setting -- the process of modeling the necessary bounds within which the development of science and technology must take place;

operational accounting, control, and analysis, and the regulation of the status of scientific and technical development -- the process of modeling the actual achieved status, its deviation from the desired state of scientific and technical development, explanation of the reasons for deviations, and also the introduction into operation of the mechanism of control, guaranteeing correspondence between the actual and desired status of scientific and technical development at the end of the period of control being examined; and

statistical accounting -- the process of modeling the actual achieved status of scientific and technical development in the closing period of control to established trends for measuring this status.

The unification of each of the named subsystems by vertical links (intersector, sector, and links of organization) permit bringing about the continuous functioning of control; for example, forecasting, planning, beginning with intersector bodies of control and ending with bodies that control scientific research institutions, design bureaus, and others in all subsections of the plan (subject fields of control) in long-range, five-year, yearly, and other periods of control. The FSYe representing the unification of several links in the cross section of one of the subsystems is called the functional complex (FK). Depending on the degree of coverage by this complex of groups of links, all FK are divided into system, intersector, sector, and lower (for research institutes, design bureaus, etc.) types.

System FK's unite into cross sections of one or another subsystems, all levels of RASUNT links: intersector -- links of intersector bodies of control, sector -- links of ministries and agencies, and lower -- links of scientific research institutions, design bureaus, and other organizations of a lower level of control. In this way, the structure of the whole diversity of functional complexes provides for the solution of problems of coordination of bodies of control over various levels in the cross section of all discrete functions of control over all subject fields and all levels of control.

The solution of the problem of the functional complexity of control consists in the coordination of selected functions into a single system providing an aggregate cycle of control from the working-up of control influence to the plan (direct tie between the subject and object of control) and the closing accounting of the actual status of the object (reverse tie). Such coordination within the framework of RASUNT is brought about by constructing complexes of control (KU). Each KU corresponds to one subsection of the plan for scientific and technical development. By analogy with functional complexes, the whole majority of KU's include system, intersector, sector, and lower complexes of control. System KU's unite all functions of control in the cross section of a corresponding subject field (subsection of the plan) at all levels of RASUNT links in the long-term, five-year, yearly, and other periods of control. Intersector KU's unite functions of intersector links; sector KU's -- the links of ministries and agencies; and lower KU's -- the links of scientific research institutions, design bureaus, etc.

Joint examination of functional complexes and complexes of control allow the delineation of functional structural units corresponding to blocks, subblocks, complex tasks, and tasks.

The support and technological sections of RASUNT represent its components which more clearly distinguish automated (man-machine) from traditional (nonmachine) systems of control.

The support section includes the methodological, informational, program-mathematical, technical, and organizational-legal types of support. To curtail expenses for their development, many of the means have been borrowed from other systems. In particular, the methodological support of the ASPR-NT block on first-priority complexes has been borrowed from the ASPR of the Ukrainian State Planning Committee; the overal systems means of information support is based on the Republic Automated System for Conduct of All-Union Classifiers of Technical-Economic Information. The basic technical and overall system program support of first-priority RASUNT is provided by the computer complex of the Main Scientific Research Institute and Computer Center of the Ukrainian State Planning Committee, outfitted with third-generation computers, and the Computer Center of the Institute of Cybernetics of the Ukrainian Academy of Sciences. The process of further development of Ukrainian RASUNT will be oriented toward utilization of the republic network of computer centers and data transmission links.

The technological section of RASUNT unites all above-mentioned supply means into a single system for information analysis on the status of scientific and technical development, including stages of registration and collection of information; its transmission; storage and analysis; and representation and dissemination.

Such are the basic outlines of the systems. The process of functioning of RASUNT is characterized by cycles and regimes of functioning, and also by regimes of service to users. Cycles of functioning reflect the dynamics of the work of the system; regimes reflect the degree of intermachine interaction between the links themselves and with external systems, that is, the degree to which RASUNT is a system; the regimes of service to users characterize the degree of "machine" participation in the selection of control decisions.

Provision has been made for long-term, five-year, yearly, and operational (less than a year) cycles of functioning; the autonomous, intrasystem, and overall system regimes of functions; information-query and information-advisory regimes of service to RASUNT users. Under the autonomous regime, the exchange of information between links is not accomplished, but the control bodies served by them exchange information by means of traditional (nonmachine) technology. For the intrasystem regime of functioning, machine technology of information exchange between RASUNT links is characteristic, and nonmachine exchange, between RASUNT and other links of Ukrainian RAS and also between RASUNT and USSR ASUNT. Under the overall system regime, the exchange of information between RASUNT and other adjacent systems of the republic and union level is accomplished with the aid of machine technology. For the information-query regime of service to users, the nondialog technology of information processing, which has received wide application in automated control systems, is sufficient. The realization of an effective information-advisory regime requires the development of many variable tasks, the organization of a data bank, and application of visual terminals, technical program means, telecommunications access, and the organization of operational dialog between man and computer.

As has been pointed out earlier, the uninterrupted development of the object of control, the changing goals of control, and also means for data processing (improvements in computers, their program support, etc.) leads to the necessity for structuring it as an adaptive, developing system, beginning at zero phase, when no task has been solved on a computer, and through the process of its growth throughout the life cycle of scientific and technical development as an object of control. The uninterrupted, adaptive character of RASUNT development requires its development in time periods by sections -- rounds, which are understood to be the functioning sections of RASUNT which have been filled out with the corresponding project, worker, and in-out documentation. The adaptivity of RASUNT development reveals that each successive round of its creation adapts to the previous one and does not contradict it. In particular, the first round of RASUNT must adapt itself to the currently existing nonmachine system for controlling scientific and technical development, the second round to the first, and so forth. Such successive adaptation guarantees not mechanical junctions but an organic union of a round which is a necessary condition for the construction of highly effective systems in the full sense of the word.

RASUNT development includes the following system of processes to be accomplished in its life cycle: the development and introduction into practice of control over scientific and technical development of first priority tasks and their union within the framework of the first round of the system; "maintenance" is the guarantee of uninterrupted work of the first RASUNT round; "growth" is the rise in the quantity of RASUNT links being developed, in the quantity of functional tasks being exploited and in the quantity of functional tasks being exploited in the links being developed and the increase caused by them in technical, program-mathematical, and informational capacity of the system: "improvement" is the betterment of the structure of tasks being developed, permitting minimalization of the time required for transition of RASUNT from information-query to information-advisory regimes of service; broadening the field of realization of machine technology for information exchange from primarily autonomous to the internal system and overall system regimes for the functioning of RASUNT; the application of more effective program-mathematical and informational means for designing and functioning of the automated bank of RASUNT data; and others.

For shortening the time periods and expenses for creating the system, the decision was adopted for maximum use of existing previous work both in the area of development and in the supply-equipment base. This decision is being realized, beginning with the first round of RASUNT, into the composition of which, in correspondence with the earlier mentioned program of introduction, goes the Ukrainian State Planning Committee link (ASUNT-PL) and the Academy of Sciences link (ASUNT-AN). The first-round blocks of Ukrainian RASUNT, selected in correspondence with the decree of the Ukrainian Communist Party Central Committee and republic Council of Ministers "On Certain Measures for the Further Improvement in the Control of Scientific-Technical Progress in the Republic," are as follows:

"Forecasting Scientific -Technical Potential (ASPP)" block;

"Planning Calculations for Science and Technology (ASPR-NT)" block;

"Control of Scientific-Technical Programs (ASUPr)" block; and

"Center for the Exchange of Current Information (TsOTI)" block.

Among the republic's previous accumulated work, the block "Planning and Organization for Introduction of Automated Control Systems and Computer Technology" (ASUVT-NT) is included.

ASPP represents a system of man-machine methods and procedures for calculating the significance of forecasting indicators for scientific and technical potential in the presence of a different type of interrelationships.

ASPR-NT is intended for raising the quality of development of plans for scientific and technical development in the sector, address, geographical, and program cross sections and for carrying them to the implementors and control over the course of fulfilment by means of computer solutions of multivariable planning tasks.

ASUPr is an automated system for the formation, analysis, and control over the fulfilment of scientific and technical programs on the most important problems of scientific and technical development and also yearly tasks that are details of the program.

TsOTI serves for the provision of controlling bodies with operational information on the requirements for scientific research and experimental design work and on the possibilities of science and technology. Therefore, the basic task of TsOTI is the operational accounting of the needs of the economy for scientific research and experimental design work and an accounting of the possibilities of scientific research organizations, design bureaus, planning organizations, and individual specialists, inventors, and rationalizers in satisfying these needs.

ASUVT-NT is the automated system designed for improving the quality of plans for the development and introduction of automated control systems for various purposes and other forms of introduction of computer technology into the economy and also for control and analysis of fulfilment of these plans.

The introduction of the first-priority blocks of RASUNT is oriented toward:

> increasing the validity and operability of decisions taken for the control of scientific and technical development through plan variations and reduction of expenditures of time in search of necessary information;
>
> broadening the horizon and authenticity of forecasts of scientific and technical potential through the application of forecasting models and computers which aid in raising the quality of the decisions made;
>
> raising the operability and realities of control over the realization of scientific and technical programs on the most important problems of scientific-technical development; and
>
> reducing the expenditure of labor of control personnel on fulfilment of routine operations in processing data

> and making time available for deeper analytical work, which aids the improvement of control decisions.

Besides the introduction of the first-priority blocks, a complex of work has been provided for the preparation and creation of RASUNT links in ministries and agencies of the republic. In particular, in 1980, industrial ministries and agencies must introduce into practice the complex of tasks mentioned earlier using query-analytical information, on expenditures for new technology measures and their economic effectiveness, which is documented as a typical planning decision.

It must be noted that the introduction of this complex task at the republic State Planning Committee has allowed the introduction into the plan, beginning in 1978, of new indicators on the release of numbers of workers and lowering production costs by means of technical improvement in production. Inclusion of these indicators in the plan for scientific and technical development is one of the first practical steps directly aiding the realization of tasks noted in the decree of the CPSU Central Committee and the USSR Council of Ministers on the improvement of planning.

It must be noted that, in connection with the complexity of Ukrainian RASUNT as a dynamic, adaptive, developing system, it is not possible to solve the enumerated problems all at once. Therefore, its improvement is brought about on the basis of the evolutionary program-aim method, in correspondence with which the creation of the system takes place continuously and its development is controlled by stages.

The creation of automated control systems for scientific and technical development in the republic is only one of the measures of the complex for improvement in the control of scientific-technical progress which are being implemented in the republic. However, as is seen in the composition of its first-priority blocks, the introduction of the first round of Ukrainian RASUNT can and must be a great help in accomplishing the tasks flowing from the decrees of the CPSU Central Committee and USSR Council of Ministers on improving planning and the economic mechanism, and also the decree of the October (1979) Plenum of the Ukrainian Communist Party Central Committee on measures for the fulfilment of these decrees.

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'PRAVDA' EDITORIAL ON REFORM OF R&D ADMINISTRATION

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[Editorial: "The Contribution of Scientists"]

[Text] In the next 10 to 15 years, the growth of production must be achieved almost entirely by raising labor productivity and without increasing the number of workers. This can be achieved only by hastening scientific and technical progress and by increasing effectiveness. A special place in the solution of such important tasks belongs to science and, most of all, to scientists and specialists who work in ministerial research institutes, design and planning organizations directly providing the integration of science and production.

"The party expects from scientists," remarked Comrade L. I. Brezhnev, "ever deeper and bolder research on new processes and phenomena, an active contribution to scientific and technical progress, thoughtful analysis of new problems, responsible recommendations for the best means for solving them in the interests of strengthening the power of the country and improving the lives of the people and in the interests of building communism."

Following the policy of the 25th Party Congress, Soviet scientists have contributed much to the appreciable growth in the country's scientific potential and have significantly broadened the front of research. Ties are being strengthened between scientific institutions and practice and the effectiveness of their work is growing. With the active participation of scientists in only the fourth year of the five-year plan, 3.5 thousand distinct new types of industrial products have been assimilated and put into serial manufacture.

Science not only brings to people the light of knowledge about nature and society, but its tree bears rich fruits. Workers of scientific and planning-design organizations of Moscow have been obligated to introduce in 1980 the results of 15 thousand research and development projects into the economy. The total effect of the practical realization of the achievements of scientists of the Ukrainian Academy of Sciences for the first four years of the current five-year plan has come to a billion rubles. Such successes can be achieved where the effectiveness of research is continuously raised, where the strategy of scientific investigation is carefully worked out, where the efforts and resources are concentrated on decisive trends, and where theoretical investigations are combined with applied developments with foresight for the needs of the economy.

However, in many places the matter is not handled that way. In recent years, about 60 percent of the examined claims of institutes have been registered as inventions. Among the industrial ministries, on the average, for each two or three projects completed by scientists and designers, there is one invention. This means that much time, effort, and resources are still spent on investigations of already known technical solutions. Approximately six or seven of every ten inventions are not realized in practice. And not only production people are at fault. The insufficiently high average level of economic effectiveness of many innovations being introduced and the small proportion of developments that provide basic changes in underlying characteristics derived from new technology, are evidence of the need to struggle more decisively against petty projects and to utilize more widely the program-goal method for organizing research to concentrate efforts on the solution of large-scale, innovative, scientific and technical problems.

Today's requirement is to equip the national economy with the most advanced technology through fundamental improvements in the activities of scientific and planning-design organizations and in the whole matter of introducing scientific and technical achievements into production. The attention of sf scientists, engineers, and designers must be focused, first of all, on those trends in research which promise tangible economic effect in the shortest time. At the same time, research horizons must be broadened today to create the engineering and technology of the future. To promote this is an important task of party organizations.

The main road toward such an organization of the matter has been determined by the decree of the CPSU Central Committee and the USSR Council of Ministers "On Improving Planning and Strengthening the Influence of the Economic Mechanism on Increasing Production Efficiency and Work Quality." Scientific research, design, and technological institutions of industrial ministries are being transferred to the cost-accounting system of organizing work concerning the creation, assimilation, and introduction of new technology on the basis of order-commissions (contracts). In them are determined the end results, the performers, and schedules for the whole array -- from idea to realization in production, and also the necessary material resources and amounts and sources of financing. A unified fund for developing science and technology is being created in ministries and agencies. Scientific organizations of industry are gradually going over to the system of accounting for work fully completed and accepted by the user. Their encouragement funds are dependent on the economic effectiveness of the introduction of the results of completed research and these funds are formed from enterprise revenues -- from the users of the innovations.

The experience of the Electrical Equipment Industry and other ministries reaffirms that the progressive system has had a beneficial effect on the tempo of scientific and technical progress. The time required for creating and assimilating new technology in these economic sectors has been curtailed noticeably, its economic effectiveness has significantly risen, and much more work is put -- not on the "shelf," but into operation.

It is even more important to hasten the transfer to this system in other economic sectors. Unfortunately, a number of ministries and agencies drag out preparations for restructuring the management of scientific and technical progress. It seems that a weighed approach is needed here; there is no place for formalism or haste. The experience of those who pioneer must not be copied blindly; it must be utilized within the context of each economic sector. In determining concrete normative indicators it is necessary to provide that they actually promote hastening the tempo of scientific and technical progress. The complexity and creative character of the task must stimulate active functioning and effective and operational decisionmaking. Party organizations must keep this work in its field of vision. Here much also depends on the USSP State Committee for Science and Technology, which can and must have a more active influence on reorganization in the economic sectors. Its successful conduct will permit a still deeper flow of scientific and technical progress and will become a marshalling point along the road to an organic combination of the achievements of the scientific-technical revolution with the advantages of the socialist economic system.

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ACADEMY OF SCIENCES OFFICIAL WANTS REGIONAL SYSTEM OF R&D ADMINISTRATION

Moscow PRAVDA in Russian 11 Jul 80 p 2

[Article by Professor K. Taksir, deputy chairman of the scientific council on economic problems of scientific and technical progress of the USSR Academy of Sciences, in the column "Management: Science and Practice": "Plan for a Region"]

> [Text] Each year the rational use of labor resources is becoming a more serious problem. Its successful solution depends on many factors. Among them are the balancing of workers' positions and the population structure, the lessening of personnel fluctuations, and the disorganized movement of the work force.
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> At the forefront, to be sure, are mechanization and automation of production and the reduction of manual labor. A complication of the problem is that at present almost half of the workers are engaged in auxiliary operations, and this restrains the growth of labor productivity.

These tasks cannot all be accomplished just within the framework of economic ministries and agencies. A complex approach is necessary that takes into account the specifics and peculiarities of local production forces. The experience of Zaporozhskaya Oblast deserves attention. Here the passportization of manual labor has been brought about. On this basis, a whole program has been worked out for raising the level of mechanization and automation of production which is now being accomplished successfully. During the years of the five-year plan at enterprises of the oblast, more than 400 mechanized and automatic lines have been introduced. Sixteen thousand people have been freed from manual labor.

Complex plans for hastening scientific and technical progress have been developed and are being implemented in many other oblasts. Scientific and planning-design organizations, production associations, and enterprises are taking part in their formulation. It seems that this work is complicated. For example, this is how the plan for scientific-technical progress was put together for the five-year plan in Donetskaya Oblast. While it was being worked on, it became clear that many economic ministries failed to take into account the requirements of the typical methods of the USSR State Planning Committee and failed to come into accord with the plan indicators. In a number of instances, approved tasks represented a collection of organizational-technical measures for only a few of which was the economic effect calculated. The regional peculiarities of production were not taken into account.

In a request by the managers of the oblast, the Institute of the Economics of Industry of the Ukrainian Academy of Sciences developed a unified typical form. The insufficient economic validity of the planned measures for new technology was revealed. Thus, in the five-year plan for the mine administration "Kholodnaya Balka" and the association "Makeyevugol'," the pay-off of the measures for scientific and technical progress was foreseen to be accomplished . . . in 35 years, and in the Artemovskiy glass factory, even longer. At the Makeyevka metallurgical plant imeni S. M. Kirov, about 10 million rubles was planned to be spent on mechanization and automation, and a reduction in the cost of products was supposed to be only . . . 11 thousand rubles.

All this is the result of a formal approach to planning on the part of the ministries. Let us say that, if in the oblast as a whole the growth of labor productivity from scientific-technical progress during the Tenth Five-Year Plan equals 63 percent of its total growth, then in separate cities it would equal less than 25 percent. Analysis of the plans of enterprises in Donetskaya Oblast, originally approved by the ministries, showed that in machine building and metal processint it was proposed to lower the proportion of workers of auxiliary production engaged in manual labor by only 2.6 percent. For ten workers of basic industry there was supposed to be a transfer to mechanized labor only one worker from auxiliary production.

A large amount of analytical and statistical work on composing the complex plan for scientific-technical progress provided a corrective to the earlier plans. As a result of the measures introduced, it is anticipated that during the five-year plan the output of new types of products in the oblast will grow by a factor of 2.3 and items of the highest category of quality, by a factor of 5.5. The effectiveness of production will also rise significantly.

Intensification of attention on the regional management of scientific-technical progress is called for by reality itself, by decisions of the 25th CPSU Congress, and by the decree of the CPSU Central Committee and the USSR Council of Ministers on improving the economic mechanism. Scientific and technical progress is being accomplished locally -- in associations and at enterprises. Therefore, it is important to coordinate efficiently and to link all measures being undertaken by ministries with the goal of complex and harmonic development of production.

As is known, many construction organizations operate locally that are subordinate to various agencies. This leads to the irrational utilization of technology, material and labor resources, and growth in volume of incomplete production. Meanwhile, regional influence on complex utilization of the capacities of construction organizations can have a significant effect. The experience of Krasnoyarskiy Kray is evidence of this. Here, only half of all capital investment is absorbed in industrial centers. Owing to the grouped distribution, the cost of construction of an enterprise on the average for each industrial center has been lowered by 20 million rubles and maintenance, by 1.5 million. The creation of industrial centers allows improvement in production resources owing to the increase in the proportion of machines and equipment, decrease in quantities of auxiliary production, organization of consolidated maintenance services, and a single transportation administration.

The geographical proximity of enterprises opens up the possibility for multilateral cooperation. The need to attract a supplementary quantity of workers is reduced and the degree of utilization of material resources is raised. Thus, the grouping of enterprises has allowed the lowering of capital investment in the construction of auxiliary plants in the Abakan industrial center by 12.5 percent.

The successful and harmonic development of the economics of oblasts and krays helps in the formation of industrial complexes and large associations. For example, the Krasnoyarsk scientific-production association "Sibsvetmetavtomatika" is bringing about a technical policy for all nonferrous metallurgical enterprises of the kray and is developing for them the means for automation and mechanization.

In recent years, there has been a sharp growth in the significance of the scientific centers of academy institutions and higher schools in the complex solution of scientific and technical problems and coordination of the activities of research and design organizations located in the corresponding oblasts and republics. On the initiative of the Western Scientific Center of the Ukrainian Academy of Science, four scientific-production complexes have been formed: machine-building, instrument building, geological-geophysical, and agricultural. This has allowed bringing about a continuous planning cycle -- "research to production," cutting down the length of time needed to introduce new technology into production and elimination of bureaucracy. The economic effect from the creation of the association just in 1979 in the oblast was more than 40 million rubles.

Many krays and oblasts have achieved regional systems of managing production quality. The experience of Krasnodarskiy Kray is evidence of the great significance of such forms. Here, the system operates in all industrial enterprises and is being introduced into agriculture and in the nonindustrial sphere. Good indicators of growth in labor productivity, of investment return, and equipment utilization are evidence of the high effectiveness of the experiment conducted in the kray. Because of the introduction of this system, the Krasnodar Machine-Tool Factory imeni Sedin, for example, in the last few years has saved up to 500 tons of rolled metal and 1.5 million kilowatt hours of electric energy.

We have noted some of the reasons that argue for the necessity of forming a regional system for managing scientific-technical progress. Undoubtedly, it can function only through the correct combination of interests of geography and the economic sector. We are speaking not of disrupting established methods of management, but of taking into consideration local peculiarities, of the realization of a single state technical policy, and of overcoming interdepartmental barriers. It is no secret that in the complicated system of management that must be integrated and bound together, the direction of the economic sector is stronger and more stable. Both the USSR State Planning Committee and, to a significant degree, the USSR State Committee for Science and Technology are oriented in this direction. As for the ministries, for their part, they underestimate and often ignore both intersector and regional problems. For this reason, the solution of a number of large scientific problems of an intersector character raises serious difficulties.

Today, in our country, we actually have bodies that carry out management of scientific-technical progress by regions. There are assistance councils under local party committees, permanent commissions under ispolkoms of the Councils of People's Deputies, scientific centers of academies of sciences and higher schools, territorial centers of scientific-technical information and State Standards, councils of directors of enterprises, and rectors of higher educational institutions. For example, the Leningrad territorial council of directors of the USSR Ministry of Instrument Making, Automation Equipment, and Control Systems includes participation by 19 associations, enterprises, and organizations. A large amount of work is conducted by the ispolkoms of the Councils of People's Deputies. Thus, the general scheme for the development of the industry of the Capital, worked out by the Moscow council, has permitted for the first time the formulation of a structure that to a large degree guarantees high rates of technical progress.

In the management of work on the optimum combination of economic-sector and regional planning of scientific-technical progress, the role of the USSR State Planning Committee and the USSR State Committee for Science and Technology is seriously growing. Unfortunately, some sector-oriented divisions of the USSR State Planning Committee underestimate the significance of regional planning and the development of regional programs. Necessary are new organizational forms and methods that would exclude departmental compartmentation. We must create a more efficient complex system for geographical management of scientific-technical progress. The bodies that exist today locally operate primarily on a nongovernmental basis; the functions are mostly not legalized. In our opinion, this work must be taken over by ispolkoms of the Councils of People's Deputies and their planning commissions. It would be useful in oblasts, krays, and republics, to create special groups or divisions for the coordination of economic-sector and regional plans. In connection with this, the necessity arises, in the preparation of a number of normative documents, for rendering systematic, scientific-methodological assistance to local bodies. It would be advisable to assign such work to a specialized scientific research organization.

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GKNT OFFICIAL ON NEW CONTRACT SYSTEM OF R&D ADMINISTRATION

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 18 May 80 p 2

[Comments by B. Motorygin, deputy chief of a department of the State Committee for Science and Technology, in response to an inquiry by a correspondent of SOTSIALISTICHESKAYA INDUSTRIYA: "Cost Accounting and New Technology"]

> [Text] The USSR State Planning Committee, the USSR Ministry of Finance, the USSR State Bank, the USSR State Committee for Science and Technology, the USSR State Committee for Labor and Social Problems, and the All-Union Central Council of Trade Unions have adopted an instruction, "On procedures for the transition of scientific-research, deskgn, planning-design, and technological organizations, scientific-production and production associations (enterprises) of an industrial ministry to the cost-accounting system for organizing work on new technology, its assimilation, and its introduction into production on the basis of commission-orders (contracts)." In response to an inquiry by our correspondent, the deputy chief of a department of the State Committee for Science and Technology, B. Motorygin, comments on this document.

The transition of scientific-research organizations, associations, amd enterprises to cost accounting should be completed this year. This means that developmental work must be conducted on the basis of commission-orders and contracts. These provide for end results that include the economic effect, the performers, and the timing of the work at all stages -- from scientific research to the introduction of results into production -- and also the necessary material resources, the scale and sources of financing, and the monetary encouragement of workers.

The ministries will transfer their organizations and enterprises to the cost-accounting system in coordination with the USSR State Committee for Science and Technology, the USSR State Planning Committee, the USSR Ministry of

Finance, the State Committee for Labor and Social Problems, and the All-Union Central Council of Trade Unions. In this transfer it is necessary to consider the specifics of a branch of the economy. In preparing for the transfer, each ministry is obliged:

> -- to analyze thoroughly the scientific-technical activity of subordinate organizations and enterprises during the preceding period, to evaluate the results of introducing new developments into the economy, and to determine the anticipated economic effect of newly created technology. In carrying out this work, wide use should be made of the positive experience of those branches of industry that are already working under the new system;
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> --to strengthen organizational-technical measures directed toward achieving a greater economic effect from new technology. Provision should be made also for shortening the normative (plan) periods for its creation and assimilation, especially that technology that significantly lowers the labor input in heavy and hazardous work;
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> --to develop measures for improving economic accounting and management organizational structure;
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> --to provide for raising the economic knowledge and practical qualifications of personnel at all levels of administration and to strengthen groups engaged in organizing research and development.

Expenditures for scientific research, experimental and design and technological work are established for a ministry in the five-year plan, with allocations by year, according to norms confirmed by the USSR State Committee for Science and Technology, the USSR State Planning Committee, and the USSR Ministry of Finance. They are determined as percentages of normative net output and, in some sectors, as percentages of commodity output at comparable prices. The fund for wages in these organizations is also determined according to norms confirmed by the USSR State Planning Committee and the USSR State Committee for Science and Technology for the five-year plan, with allocations by year, in percentages of expenditures for scientific-research, experimental-design, and technological work.

For the stimulation of the manufacture of highly effective new products in organizations being transferred to the cost-accounting system, funds are being created for monetary encouragement, for social-cultural measures, and housing construction, and for organizational development. Workers' bonuses are set dependent on the actual economic effect achieved.

In the ministries, a "unified fund for the development of science and technology" is being created for financing scientific-research, experimental-design, and technological work and for compensation for expenses connected with the preparation and assimilation of the production of new types of products and technological processes and connected with the introduction of efficiency standards. It is used also for compensation for increased expenses during the first years of producing a new product.

This fund is formed from deductions from the planned profit of scientific-production and production associations and enterprises. The normative deductions are established in the five-year plan with allocations by year in percentages of normative net output and, in some sectors, in percentages of commodity output. For financing especially important scientific-technical work that requires significant expenditures, State budget funds can be used, upon decision by the USSR State Committee for Science and Technology and the USSR Ministry of Finance.

If, during the year, the revenues of the unified fund for the development of science and technology do not equal the expenditures from it, the USSR State Bank or the USSR All-Union Bank for Financing Capital Investments will extend credit to ministries and agencies. Scientific-production and production associations and enterprises can also receive such funding, but only in the event that they take highly effective measures to develop science and technology not provided for by the plan.

This credit is offered under guarantee by the ministry or by an all-union (republic) production association. Credit and interest for it must be liquidated in two years from the unified fund for the development of science and technology.

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KOPTYUG REVIEWS 'SIBIR'' PROGRAM

Moscow TRUD in Russian 21 Aug 80 p 2

[Article by Academician B. Koptyug, chairman of the presidium of the Siberian Department of the USSR Academy of Sciences: "The Union of Science and Production"]

[Text] The Siberian Department of the USSR Academy of Sciences has formulated a large-scale program, named "Sibir'," for the complex utilization of the very rich natural resources and the effective development of the productive forces of the eastern regions of the country. This superprogram will be carried out by over 230 scientific-research and planning-design collectives of various agencies, including 46 institutes and organizations of the Siberian Department; it includes 35 goal-programs devoted to the exploration and development of mineral raw material resources, the creation of new materials and technologies, and the rational utilization of earth, forest, and water resources. Also included are the development of agricultural production, the solution of large interdepartmental problems, such as the economic assimilation of the zones of the Baykal-Amur Mainline, the optimization of the development of regional production complexes, and social-economic aspects of Siberian development.

In order to present more clearly the essence and role of the "Sibir'" complex program, it may be advisable to recall briefly how it was formed. First of all, at scientific-technical conferences and in active party and economic groups of the oblasts, krays, and autonomous republics of Siberia, there were thorough discussions of the most important economic problems of a regional character and the scientific and technical tasks connected with them. Strong creative relationships between the scientists of the Siberian Department of the USSR Academy of Sciences and many union and republic ministries and agencies have permitted a refinement of regional problems with consideration of the developmental prospects for each economic sector.

The relationship of fundamental, applied, and planning-design work can be illustrated by examples of programs directed toward the development of coal extraction and processing. Scientists of the Siberian Department of the USSR Academy of Sciences in recent years have made a substantial contribution to the development of the theoretical foundations of the mechanics of monolithic, stratified, and broken materials and rock formations. This research has stimulated scientific-technical progress in a number of important areas of the extracting branch of the industry and has served particularly as a platform for uniting the efforts of specialists on the mechanics of rock formations of the Siberian Department and of the USSR Ministry of the Coal Industry within the framework of the "Coal of the Kuzbass" program. Its aim is the improvement of the technology of extracting valuable coking coal as its development moves on to zones of increasingly complex mining and geological characteristics.

The creation of new methods and instruments for the control of rock-formation stress and rock transfer with computer development of the data received has permitted the refinement of theoretical models and proposals for forecasting the appearances of rock formation stress which, in its turn, makes possible the scientific substantiation of the selection of technology for the development of a coal bed, depending on the actual mining and geological situation. The Ministry of the Coal Industry, having evaluated the prospects, adopted the solution for the organization of service on rock-formation stress in three production associations in the Kuzbass.

Essentially different problems are affected by the program "Coal of the Kansk-Achinsk Basin." Large beds of these coals lie close to the surface and can be worked by open-pit means. However, high humidity and the tendency toward combustion during dry conditions makes this Kansk-Achinsk brown coal unprofitable for transporting to other regions of the country. Consumption within the boundaries of a limited territory, of large quantities of these coals to produce electrical energy can lead to definite ecological difficulties. Thorough analysis of the situation, in which active participation of economists from the Siberian Department was received, has led to the consideration of processing a significant part of the coal of this basin into light, transportable artificial liquid fuel. Several scientific collectives are working on the solution of this problem. Resting on the serious achievements in the field of plasma chemistry, the physics of plasma, the magnetohydrodynamic transformation of energy, and catalysis, scientists of a number of institutes of the Siberian Department and Krasnoyarsk State University have proposed a plan for the complex, non-waste, chemical energy processing of Kansk-Achinsk coals, in which electric energy is generated along with the production of hydrocarbon products. At present, this plan is undergoing study.

The above examples demonstrate the role of the "Sibir'" program in integrating the efforts of academy, ministerial, and higher-school science and in strengthening relations between science and the economy. The "Sibir'" program and the results of research conducted within its framework serve as strong support for the long-range and short-range planning for economic development. This has been reflected in the joint decision by the RSFSR State Planning Committee, the RSFSR State Committee for Construction Affairs, and the Siberian Department of the USSR Academy of Sciences "On Proposals for the Development of Scientific-Technical Progress in the RSFSR," as well as in the recommendations of the recent All-Union Conference on the Development of the Productive Forces of Siberia.

Despite the fact that the "Sibir'" program was formulated only two and a half years ago, the scientists of Siberia, resting upon earlier accumulated scientific potential and upon the results of joint work under the present program, have introduced a large number of scientifically substantiated planning proposals for the next five-year plan. These proposals pertain to the volume and trends in geological exploration, the development of Siberian fuel and energy complexes, the complex processing of useful minerals, rates of construction and economic assimilation of BAM zones, the development of industry and agricultural production, the social infrastructure, and the training and strengthening of personnel resources. Of especially great significance is the substantiation of the rates and proportions of Siberian economic development that are necessary for achieving maximum effect in terms of the country's whole economy. Analysis conducted by economists of the Siberian Department reveal that for this the rates of development of Siberian productive forces must exceed the average rates of economic development of the country by a factor of about 1.3.

The Siberian Department of the USSR Academy of Sciences presented to the USSR State Planning Committee, a proposal for the next five-year plan of twenty large scientific and technical developments with important economic significance. Among them are new geophysical and aerospace methods of searching for useful minerals; complexes of machines for the construction and mining industries that provide for mechanization and automation of labor-consuming processes; electronic accelerators and substantiation of their use; chemical radiation technology for a number of industries; the electrochemical method of extracting metals from diluted solutions; catalytic heat generators which make use of a new principle of fuel combustion; an effective regulator of plant growth that hastens maturation and increases the yield of a number of agricultural crops; and many other developments, the utilization of which will provide great economic effect.

The "Sibir'" program is an important step on the road of transition to the program-goal principle of planning, to the organization of scientific research, and to the utilization of its results in the economy. It effectively supports the solution of intersector and interregional problems which still do not always receive the required attention.

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ESTONIAN ACADEMY OF SCIENCES PRESIDENT FAVORS CONTRACT R&D

Moscow IZVESTIYA in Russian 22 Aug 80 p 2

[Article by K. Rebane, president of the Estonian Academy of Sciences and deputy of the USSR Supreme Soviet: "Scientists Are Production: The Introduction of Scientific Achievements Under Economic Agreements"]

[Text] First among the tasks recorded in the charter of the Academy of Sciences of the Estonian SSR is "the development of fundamental research along the basic lines of natural, technical, and social sciences." And it is from this underlying idea that another important requirement flows: the strengthening of ties between the academy and production.

Among the various forms of ties between the Estonian Academy ot Sciences and industrial and agricultural production, two large fields of study can be distinguished: complex, goal-oriented programs and contract work.

Ten complex programs, developed in our academy and being implemented during this five-year plan, unite the efforts and resources of a whole series of collectives, not only those of the academy, but also those of other research institutions of republic and union subordination. Let us take as an example the program "Theoretical Bases for Increasing the Productivity of Plant Growing and Animal Breeding," which is being coordinated by the Estonian Academy of Sciences. It is being accomplished at a single complex with four republic scientific and technical programs being managed by the Estonian Ministry of Agriculture and directed toward the achievement of high indicators for grain production, animal products, and potatoes and toward the development of a feed base. Through these programs, the results of many years' academy research in biology, chemistry, biochemistry, geology, and economics are being introduced into agricultural practice.

At the present time, the soils of agricultural land within the territory of our republic are being studied, and ways to utilize them properly are being scientifically verified. The Institute of Geology has provided their land-reclamation and hydrology characteristics from the point of view of preserving underground water. These materials are taken into account by design organizations in putting together long-range programs for land reclamation in the republic.

The Institute of Experimental Biology, in close cooperation with seedgrowers, already has been conducting work for a number of years on the study of virus diseases of potatoes and on the preparation of antiviral sera. Research by this same institute on physiology has permitted a proposal for a new mixed feed ration for broilers. With an insignificant increase in feed costs, the "Raina" sovkhoz , for example, now has broilers with live weight at time of consumption 27 percent more than under the former ration. The yearly effect calculated on the basis of one bird per 1000 square meters is 55 thousand rubles. In the nursery of the Tallin Botanical Garden, seeds of a high-quality type of carnation are being grown. On farms of the Estonian Ministry of Agriculture, flowers are being grown from these seeds in total value of 8 million rubles a year. The Institute of Economics made forecasts for the republic State Planning Committee for the agricultural development of Estonia up to the year 1990 and up to the year 2000

Some parts of the programs successfully enrich one another. The agricultural program is closely related to the program for the protection, restoration, and utilization of natural resources, and also to the program for "Forecasting and Planning the Economic and Social Development of the Republic."

In the last five-year plan, a complex production technology was created for a number of fragrant substances for the needs of everyday chemistry, on the basis of fundamental research by the Institute of Chemistry. The production of one of these -- iris oil -- was done in 1974 at the experimental plant of the institute. The volume of production of this scarce product, which replaces an imported one, exceeds a half million rubles a year.

Now, the Institute of Chemistry, continuing along the same lines of research, has developed a synthesis of a new class of chemical agents for plant protection that are not harmful to the environment. Jointly with scientific institutions of the USSR Ministry of Agriculture, methods have been developed for applying phermones for eliminating the dangerous root-system pests, the click-beetle and the wireworm. In cooperation with ministerial institutes of the Ministry of the Chemical Industry, new effective means have been synthesized for fighting insects that are nontoxic to man.

It is clear that such really complex, very difficult programs for research and experimentation can develop effectively only where there is a fully predetermined prospect for the introduction of the results into production, with fixed schedules. For this, it is necessary in advance to guarantee mutual relationships and cooperation between research collectives and between design organizations and feasible bases for introduction of new technology. Here, the academy places great hopes on the joint plan for scientific research and development with the USSR Ministry of the Chemical Production Industry.

The program "Preparational Biochemistry" also found a welcome entrance to agricultural practice. The biotechnology for making physiologically highly active compounds necessary for medicine and agriculture was developed.

Study of the structure of molecules and crystals using nuclear magnetic resonance has been solidly supplied with research machines and equipment at the Institute of Chemical and Biological Physics. With "pure science" objectives, the finest details of the structure and properties of complex molecules and molecular structures are being studied. However, this large laboratory potential has turned out to be necessary also for accomplishing practical tasks -- the precise identific ation of fragrant substances being synthesized in the Institute of Chemistry.

Here, still another aspect of science-production relations stands out: a real, up-to-date production process is not possible today without using progressive methods and instruments with precision near that of scientific laboratories. In a number of contemporary industries, the needed level of technology and quality of products cannot be provided tomorrow, if today there is no advanced scientific instrument making and up-to-date methods are lacking in research laboratories.

Wide application is being found for new gas chromatographs prepared by a special design bureau of the Estonian Academy of Sciences within the framework of the "Scientific Instrument-making" program. Domestic consumers are not the only ones interested in these products. Thus, for example, chromatographs made by the "Laboratory Instruments" firm in the Czechoslovak SSR will be fitted-out with highly sensitive detectors from our own special design bureau which will permit determination of extremely small quantities of chlorine-containing chemical substances.

Scientists of the academy participate in determining the more effective ways -- with consideration for the requirements for protecting nature -- for extracting and utilizing local useful minerals. The Academy of Sciences conducts two programs that have a high degree of significance for the republic: one is for complex research and utilization of combustible shales and the other, for the rational utilization of phosphorite deposits. For both programs, participation by a significant number of republic and union institutions and organizations is characteristic. Thus, the phosphorite program comprises projects of 15 republic and 10 all-union institutes and organizations.

Two large, unique electric stations in Estonia operate on shale fuel. Along with receiving cheaper electric energy for the northwest part of the country, the very important task of fully utilizing the mineral remains of the shale -- shale ash -- was successfully accomplished. It is being successfully used to inject lime into acid soil: the yearly growth of the harvest is estimated at 15 million rubles. Part of the ash goes into the preparation of cement of high quality and structural components.

An important form of relationship with practice are the projects being done according to economic agreements with enterprises and organizations. Questions concerning the introduction of new technology, as a rule, are natural in this context and have already been decided fully and concretely when the agreement is concluded. Money for work under an agreement, which is written down as expenses in the accounting department, is an effective guarantee that the results to be handed over by the scientific institution will not really be ignored by the sponsor.

The conclusion of economic agreements by our institutes began in the 1960's with 50 thousand rubles. Now, the money coming in under economic agreements constitutes a significant proportion (about a third) of the state budget allocations to the academy. In the institutes of physics and engineering this proportion is even greater. The economic effect received from introducing scientific results into practice (that is, from projects done under economic agreements), the Institute of Cybernetics alone, over a five-year period, is estimated at 3.2 million rubles.

The creation by the Institute of Astrophysics and Physics of the Atmosphere of the Estonian Academy of Sciences of an assembly of onboard apparatus for the orbital station "Salyut-4," serves as an example of how contractual projects give new force to basic scientific research and at the same time help accomplish practical tasks. With the aid of this apparatus, using procedures developed by the institute, research was done from space on noctilucent clouds -- a phenomenon of the upper atmospheric layers which is interesting on the scientific level and important on the practical level. Noctilucent clouds are an important research subject in the physics of the atmosphere. In this area, the institute is the leading institution in the country and is recognized as a world center. Observation from onboard the space station has provided valuable scientific and applied results that could not be obtained by other means. A collective of researchers and instrument builders composed of four astronauts and four researchers of the institute was awarded a republic prize in 1977.

The Institute of Thermophysics and Electrophysics is accomplishing a large contract project to supply a magnet to the International Wroclaw Magnetic Laboratory. In parralel, physicists are preparing to participate in the future experiments of this laboratory.

In summary, it seems that the volume of contract work in our academy has reached a high level. Further increases in volume, despite the advantageous financial support being received from such work by institutes, would not be expedient: at academy institutes and the special design bureau, it would be necessary to bear a substantial loss in exploratory research and in other projects for introduction of new technology being conducted without contracts. The Academy sees as its task that the thematics of contract work each year combines more and more organically with the basic scientific trends and aims of the institutes.

The possibilities are great for further significant increases in the effectiveness of science and the strengthening of the union between science and production. Comrade L. I. Brezhnev said at the November (1979) Plenum of the CPSU Central Committee: "In the accomplishment of the pressing tasks that face the economy, especially at the threshhold of the next five-year plan, the party is counting on active assistance on the part of our scientists . . ." This is a large amount of faith. The scientists of Estonia will exert all their strength to justify him and to provide a worthy welcome to the 26th CPSU Congress.

9645
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FUTURE PLANS FOR SCIENTIFIC RESEARCH WORK IN VUZY

Moscow IZVESTIYA in Russian 12 Sep 80 p 2

/Article by I.Makarov, deputy minister of Higher and Middle Special Education, USSR, corresponding member of the USSR Academy of Sciences: "From Science to Production: The Institution of Higher Learning is Offering a Novel Idea: How Can Its Adoption Be Speeded UP?"7

/Text7 While preparing for the 26th CPSU Congress and making plans for the Eleventh Five-Year Plan, we must give thought to the training of the personnel who will ensure the fulfillment of these plans.

Today when scientific-technical progress is becoming a primary factor in the development of the economy and our culture, it is simply impossible to train and educate skilled personnel who are capable of creatively solving professional tasks without the professors and scientists carrying out scientific research and developmental work at the very latest level of knowledge and without actively involving students in research and creative work.

In the USSR's 870 institutions of higher learning is concentrated more than a third of all scientific-pedagogical workers. Nearly one half of the best trained scientists works in the universities and institutes. In 1979 among the institutions of higher learning of the USSR Ministry of Higher and Middle Special Education alone the amount of expenditures for research and developmental work was almost one and a half billion rubles.

The output of VUZ science for the national economy is also increasing. During 1979 the universities and institutes of the USSR Ministry of Higher and Middle Special Education adopted for production the results of more than 17,000 projects. The confirmed economic savings from their use exceed nearly two-fold the expenditures for all the research that is conducted in the institutions of higher learning.

The new stage in the development of scientific-research work in the VUZY, as the basis for raising the quality of the training of the modern specialist, was marked by the passing in April 1978 of a Decree of the CPSU Central Committee and the USSR Council of Ministers "Concerning the raising of the efficiency of scientific-technical work in the institutions of higher learning". Serious attention was given to VUZ science in the Decree "Concerning the further development of higher education and raising the quality of training specialists", which was enacted by the CPSU Central Committee and USSR Council of Ministers last summer.

In approaching VUZ research from these high positions, one cannot help but note that, unfortunately, we are not making full use of the scientific potential of higher education. At the same time we frequently create research institutions, which scarcely have the necessary basis and, most important, which do not have the skilled personnel, to solve new scientific-technical problems. The carrying out of these projects could be handed over to the VUZY which already have an adequate scientific reserve in one field of knowledge or another.

We are also disturbed by the fact that many promising specimens of new equipment and proposals for improving technology, the organization of labor and management, which have been created in the VUZY, cannot find their way into practice. Unfortunately, the so-called "single adoption" practice is very widespread: one or several models of new devices or equipment, created in the VUZY, is manufactured and used by the enterprise-customer.

Apparently, the time has come to think up a mechanism for the VUZY to make use of the principles of planning and specialization in research aimed at increasing the motivation of the VUZ workers to make practical use of the new scientific data and technical solutions that they receive. The possibility for making this a reality can be found, in particular, in the creation at the leading VUZY of scientific-research units, as unified scientific institutions with the rights of a scientific-research institute, and also the cost accounting scientific association within the USSR Ministry of Higher and Middle Special Education. Sometimes the VUZ workers are responsible for the difficulties that arise in the adoption process. Some projects do not make it into practice because of the low technical-economic level of the obtained results. The subject-matter of some VUZ research is not in line with the promising trends of scientific-technical progress.

In a speech at the 25th CPSU Congress, Comrade Brezhnev emphasized that "the practical adoption of new scientific ideas is today a no less important task than their development." In carrying out these instructions, the VUZY are exerting themselves to bring their projects to the production line. Ties with enterprises and organizations are being developed and strengthened; and long-range and annual plans for adoption are being drawn up.

The improvement of the planning of research and design work is aimed at speeding up the adoption of scientific achievements into the national economy. The extensive use of program-target method of planning and organizing science must play an important role. The results of VUZ research, conducted according to programs of the USSR State Committee for Science and Technology and sectoral and republic plans, as a rule, find their way into practice. However, today the number of such projects is less than 20 percent of the total that are carried out according to the subject-matter plans of the VUZY. The majority of the research results that are not adopted are not included in these plans and it is their fate that is a matter of concern.

A draft list of the most important scientific-technical programs for 1981-1985 has been prepared. In accordance with the USSR State Committee for Science and Technology the USSR Ministry of Higher and Middle Special Education will make use of the VUZY to fulfill these programs. Simultaneously the VUZY are coordinating the subject-matter of their research with the sectoral ministries and departments and with their lead organizations for incorporating the largests and most promising projects in the sectoral plans. The successful work of the VUZY in the forthcoming five-year plan will largely determine how efficiently and qualitatively these measures are accomplished. In connection with this the well-disposed attitute of our planning organs, ministries and departments toward the proposals of the VUZY is particularly important. It is also important that the research be supported with the needed limits, allocations and funds for material-technical resources.

Higher education receives constant assistance and support from the USSR State Committee for Science and Technology, where a special commission has been created for the extensive adoption of scientific-research projects that the universities and institutes have completed. During the Tenth Five-Year Plan alone the commission has examined more than 300 projects. A significant portion of the projects was included in the state plans for the economic and social development of the USSR or in the sectoral plans for new technology. Unfortunately, the decisions of the commision are of a purely advisory nature and are not mandatory for the sectoral ministries and departments, which reduces the efficiency of its work. We believe that it would be proper to broaden the rights of this organ for making decision concerning the assimilation into production of the new, promising technology that was created within the VUZY.

Many projects, completed by the VUZY, are not being adopted because the sectors lack the needed capacities, material-technical, labor and financial resources for the rapid restructuring of production and the assimilation of new technology. The creation of such reserves and additional capacities is a task, the solution of which, in our opinion, is largely dependent upon the rates of assimilation and series production of new technology.

An effective form for the organization of VUZ science is the creation within the universities and institutes of sectoral scientific-research laboratories, which are financed by the appropriate sector of the national economy. In concept these laboratories must serve as a connecting link between the VUZ and the sector, since orders for research come directly from the sectoral ministries. This makes it possible to exclude from the plans unpromising and insignificant topics and to concentrate on the solution of crucial problems facing the sector.

The number of such laboratories increases from year to year; at present there are about 1,000 of them. However, on the whole the industrial ministries and departments are still not sufficiently actively proceeding toward the creation of sectoral laboratories, particularly within the enterprises. The volume of research being performed in these laboratories is not less than 14 percent for the USSR of the total amount of contract projects being carried out in the VUZY.

Another promising form of cooperation between higher education and the national economy, which has been widely disseminated in recent years, is the organization on voluntary initiatives of training-scientific-production associations (UNPO). These associations are created within the VUZY or their subelements or industrial enterprises. Often the associations incorporate scientific-research institutes and design bureaus. The associations created by the Belorussian polytechnical institue and the Belorussian Automobile and the Minsk Tractor plants, the Leningrad Polytechnical Institute and the Elektrosila Association, and the enterprises of the Karaganda Coal Trust are well known. There are now more than 100 such associations in the Soviet Union. The creation of the UNPO makes it possible to comprehensively, on a long-term basis develop ties between the VUZY and production and simultaneously respond to its needs.

The Achilles heel of scientific work in the universities and technical VUZY is the underdeveloped experimental and design work base. Without the appropriate design and technological study, not even the most valuable proposal of the VUZ can be accepted by an enterprise or other organization for broad adoption. The transfer of the results of VUZ research to the sectoral organizations for further work often delays adoption for many years and frequently leads to the VUZ losing its inventor's certificate.

One of the efficient ways to solve the problem of adoption is to create within the large VUZY planning and design offices that are equipped with modern technical means, systems for automated design work, and systems for the automated development and preparation of production. Such subelements make it possible to finish the scientific projects that the VUZY have completed, thereby speeding up their adoption. This also makes it possible, having involved the students in the research, to ensure the training of specialists-designers and planners on actual projects and on a modern technical base.

The sharp speeding up of the practical realization of the new scientific ideas and technical solutions, discovered in the VUZY, promotes the availability within the VUZY of experimental production facilities. Thus, it took less than a year for the experimental plant of the Moscow Power Engineering Institutue to assimilate the manufacture of new, modern modules for the KAMAK system, which is to be used for the automation of experiments. Of course, it is not realistic to require every VUZ to create a large design office and experimental production facility, nor would this be advisable. In some union republics there is already some positive experience in the creation of inter-VUZ design offices and experimental plants. Such work is being carried out, in particular, in Kirghizia, Kazakhstan and Belorussia. This experience must be carefully studied and disseminated.

The inter-VUZ centers for the study of scientific research must play a significant role in the development of scientific work in higher education. At present they are designing the first such center in the city of Dnepropetrovsk. In the future there will be a network of such centers.

However, the construction and outfitting of the inter-VUZ centers is a new matter and there are difficulties in solving these questions. The main difficulty is that the USSR Gosplan is not allocating the needed capital investments for these construction projects in the plans of the USSR Ministry of Higher and Middle Special Education.

At the all-union conference of the workers of higher education in the Kremlin the need to ensure the development of higher education as an intersectoral research complex, capable of conducting work in all sectors of knowledge and actively adopting its results into the national economy, was emphasized.

The scientific potential of the VUZY and their highly skilled personnel can serve as a reliable guarantee that this task will be carried out. However, the realization of this goal is a concern not only of the universities and institutes. The planning organs must make an important contribution to its solution. The USSR Academy of Sciences and the sectoral ministries and departments also must contribute. In other words, the organizations which can find in the VUZY a reliable support for solving the most important research problems and as appropriate take the VUZY into consideration when formulating their scientific policy. It is necessary to overcome the departmental approach to VUZ science as "not our own", which, unfortunately, is still quite common in some sectoral ministries. And, of course, the greatest responsibility for successful fulfillment of this goal rests with the USSR Ministry of Higher and Middle Special Education as the organ required to determine the trends in the development of Soviet higher education in all spheres of its work.

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NEW 'ACADEMIC CITY' TO BE BUILT IN LENINGRAD

Moscow IZVESTIYA in Russian 7 Sep 80 p 6

/Article by A. Viktorov/

/Text/ A major new scientific center--the Leningrad Academic City--is to be built in the northern outskirts of Leningrad in a picturesque forest park zone on the shores of a lake.

Its embryo is the Physical-Technical Institute imeni A. F. Ioffe building, which has already been built. Realization of the general plan's design for the academic city is now beginning. It was developed by the Leningrad Division of the USSR Academy of Sciences Institute for Design and Planning.

The Division's director, the architect A. Bocharov, who is heading the design work, reported that the Academic City will occupy a territory of more than 300 hectares. It is planned to erect more than twenty complexes of buildings for Leningrad's scientific research institutes, institutions of the USSR Academy of Sciences, and administrative and engineering services here.

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